



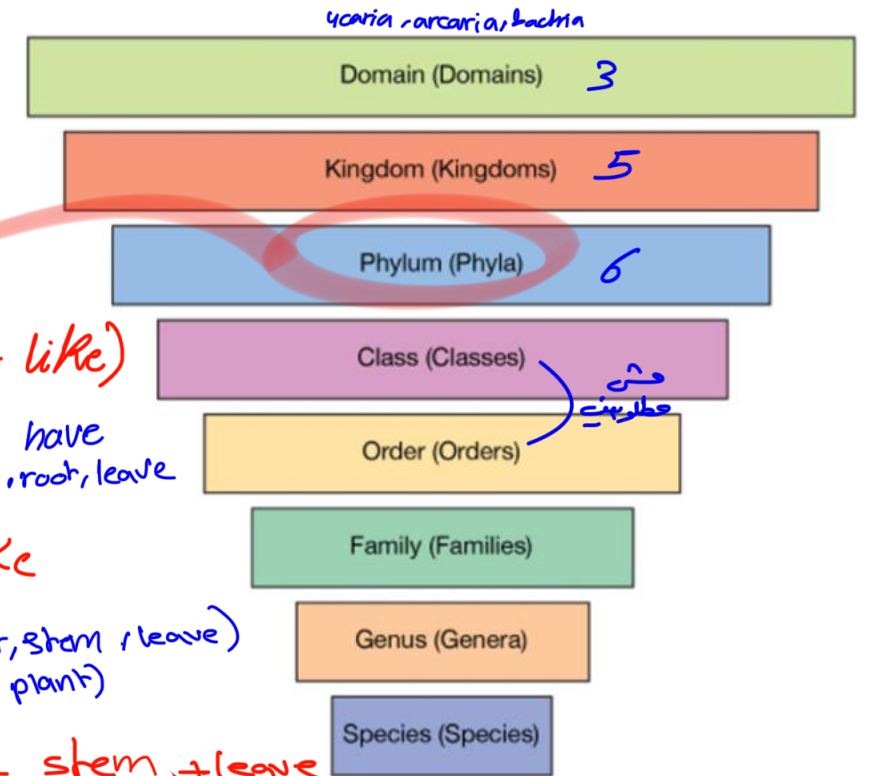
A TAXONOMIC APPROACH TO THE STUDY OF MEDICINAL PLANTS AND ANIMAL DERIVED DRUGS

إعداد الطالبة: آلاء العتوم

1-In this chapter the principal plant families of pharmaceutical interest are arranged according to the botanical scheme of Engler.

2-The chapter is divided into six parts: (phylum) (plant like)

- 2-1 Thallopiphytes (bacteria, algæ, fungi and lichens) *don't have stem, root, leave*
- 2-2 Bryophytes (liverworts and mosses) *steam like & root like*
- 2-3 Pteridophytes (ferns, clubmoss and horsetails) *have vascular system*
- 2-4 Gymnosperms (Spermatophyta → seed-bearing plants with unprotected ovules) *true stem + leaf + root (true plant)*
- 2-5 Angiosperms (Dicotyledons)
- 2-6 Angiosperms (Monocotyledons)



Linnaean Taxa

Taxa	Ending
Kingdom	
Division	→ -phyta
Class	→ -opsida
Order	→ -ales
Family	→ -aceae
Genus	No standard ending
Species	No standard ending

THALLOPHYTES

1-The old term '**thallophyte**' ^{plant like} includes those plants which are not differentiated into root, stem and leaves. Engler divides them into 13 phyla. plant like

2-They include:

A-Bacteria

B- Algae

C-Fungi

D- Lichens.

A-BACTERIOPHYTA

*-The **bacteria** are **unicellular organisms**, the great majority of which range in ~~size from 0.75 to 8µm.~~

** - Bacteria **exist in a number of characteristic shapes**, namely:

① **Rod-shaped** or bacillary forms (e.g. *Clostridium welchii*, *Escherichia coli* and *Bacillus subtilis*).

② Spherical or **coccal forms**, which can occur singly but are **usually found** in characteristic aggregates i.e. in chains (**streptococci**), in groups of two (**diplococci**), four (**tetrads**). **Aggregates of irregular** pattern are said to be of **staphylococcal** form.

bacteria of skin & staphylococci

bacteria of skin ←

ملفوظ آخر درسه
3. **Twisted or spirillar** forms which, if having a **single twist**, belong to the genus *Vibrio*, while those with **more than one twist** belong to the genus *Spirillum*.

4. **Branched** forms which sometimes occur in the genus *Mycobacterium*.

→ Bacteria are able to **carry out** a very wide range of **chemical reactions**, some of which are used for **identification and differentiation**, in addition to forming the basis of many important industrial processes.

→ for example, in the **production** of vinegar, acet-
one.

→ The **production** of hydrogen sulphide from organic sulphur compounds.

و البکتریا مختلفه لایزهارها
different pharmacological effect

B- Algae، طحالب، طحالب

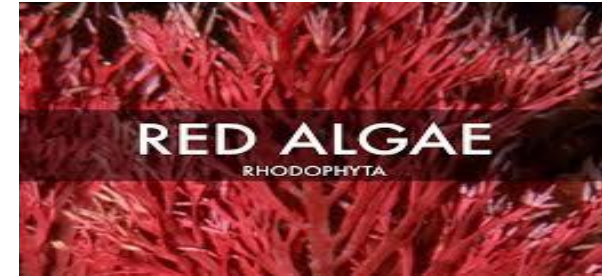
- 1. diatom, → unicellular algae, have a silica skeleton, and show infinite variety in shape and in the sculpturing of the cell wall.



2-Phaeophyta

-Brown Algae

-Red Algae



→ *Chondrus crispus* (yields carrageen or Irish moos)
كنافة البحر، الطحلب الفرضوفى، كوندريس

يستخدم كعاشق
لا يغطي طعام
أحرق الكحل.



فناؤاع algae

C- FUNGI ^{→ brain of plant.} فطور، فطر

1- ASCOMYCETES: PROTOASC**ALES**

1-1 Saccharomycet**aceae**:

Dried yeast is prepared from a strain of

Saccharomyces cerevisiae.



1-2 A member of the related family

Cryptococc**aceae** is *Candida utilis*, which produces torula yeast, a rich source of

proteins



Candida utilis

مطوب فطور
① family 1
② species.

C- FUNGI فطور، فطر

1- ASCOMYCETES: ~~PROTOASC~~ALES

1-1 Saccharomycetaceae:

Dried yeast is prepared from a strain of
Saccharomyces cerevisiae. Family
Species

1-2 A member of the related family

Cryptococcaceae is *Candida utilis*, which
produces torula yeast, a rich source of
proteins



Candida utilis



2- PLECTASCALLES

2-1 Aspergillaceae

→ Penicillium yields important (species)
antibiotics such as penicillin and griseofulvin

3- CLAVICIPITALES

3-1 Clavicipitaceae (pathogen)

Genera of the Clavicipitaceae include *Claviceps*

(10 spp.) → *C. purpurea* ^{صبا القمح} (Ergot) (alkaloids) ^{صدى القمح}



D- LICHENS

اشنة

1- A lichen is a **symbiotic** association of an **alga** and a **fungal partner**. Some, particularly in **arctic regions**, are **used as food**.

→ mask taste of caught drugs -

2- **Iceland moss**, *Cetraria islandica*, has been used for disguising the taste of **nauseous medicines** and with other species for the **treatment of cough**. (antibacterial effect)

3- Many lichens **have antibiotic properties**.



Iceland moss - Cetraria islandica



no stem
no root
no leave

shutterstock.com - 238277716

على الحجر
stone
بالتحتون لقطيع
الباردة
stem
leaf
root
عصا - سوي - فوا
بالعين



BRYOPHYTA حزازيات

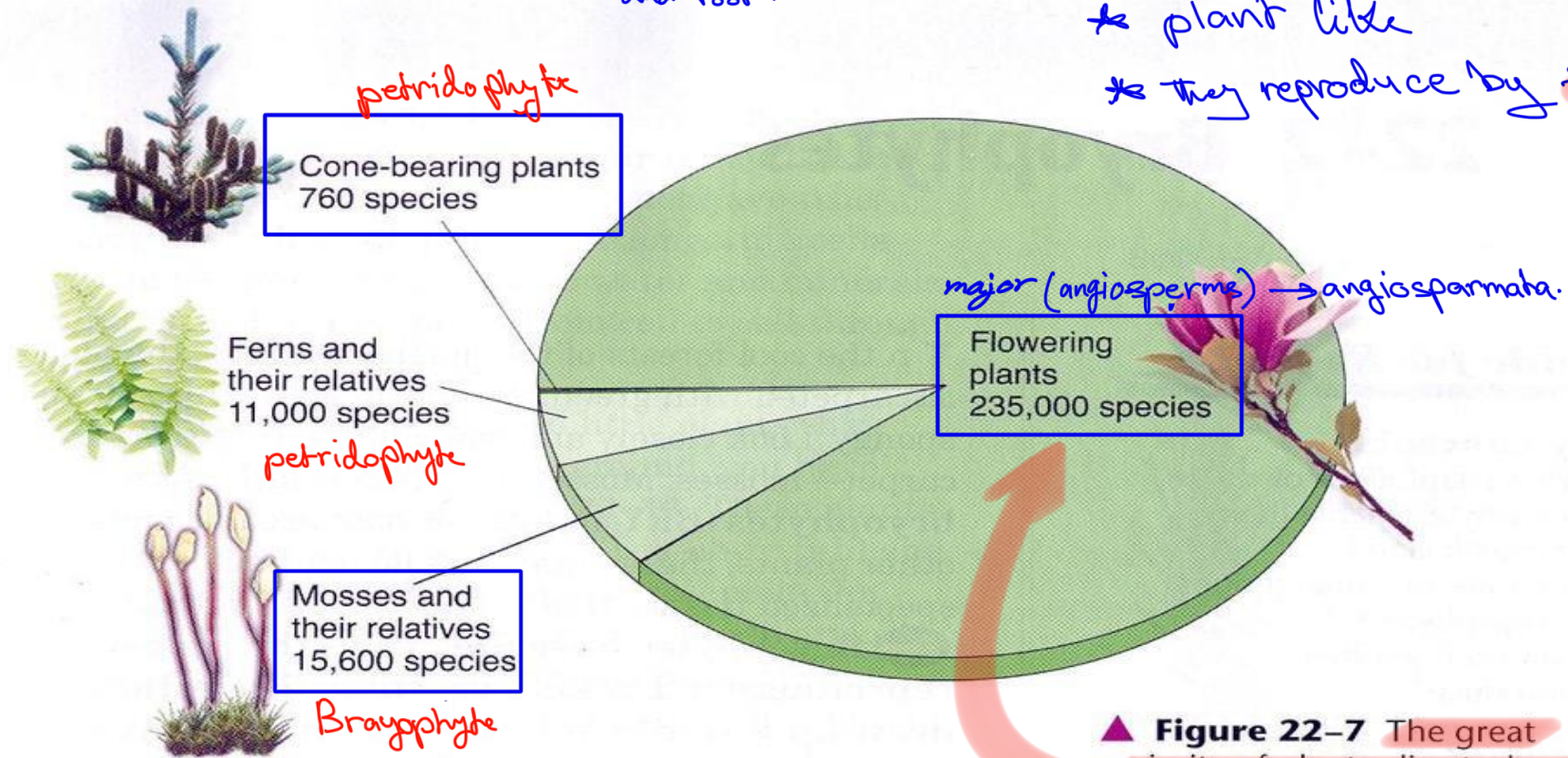
عند الحزازيات
لا يوجد
جذع
و لا
جذور

↳ they don't have stem and root.

↳ they don't have vascular system

* plant like

* they reproduce by spores.



▲ **Figure 22-7** The great majority of plants alive today are angiosperms, which are also known as flowering plants. **Interpreting Graphics** What is the second largest group of plants? bryophyte

1-The phylum is divided into two classes, Hepaticae (liverworts) and Musci (mosses). *leaves like* → *don't have a stem*

2-The pharmacologically active terpenoids (sesquiterpenes, diterpenes) and

aromatic compounds of the bryophytes have been well studied.

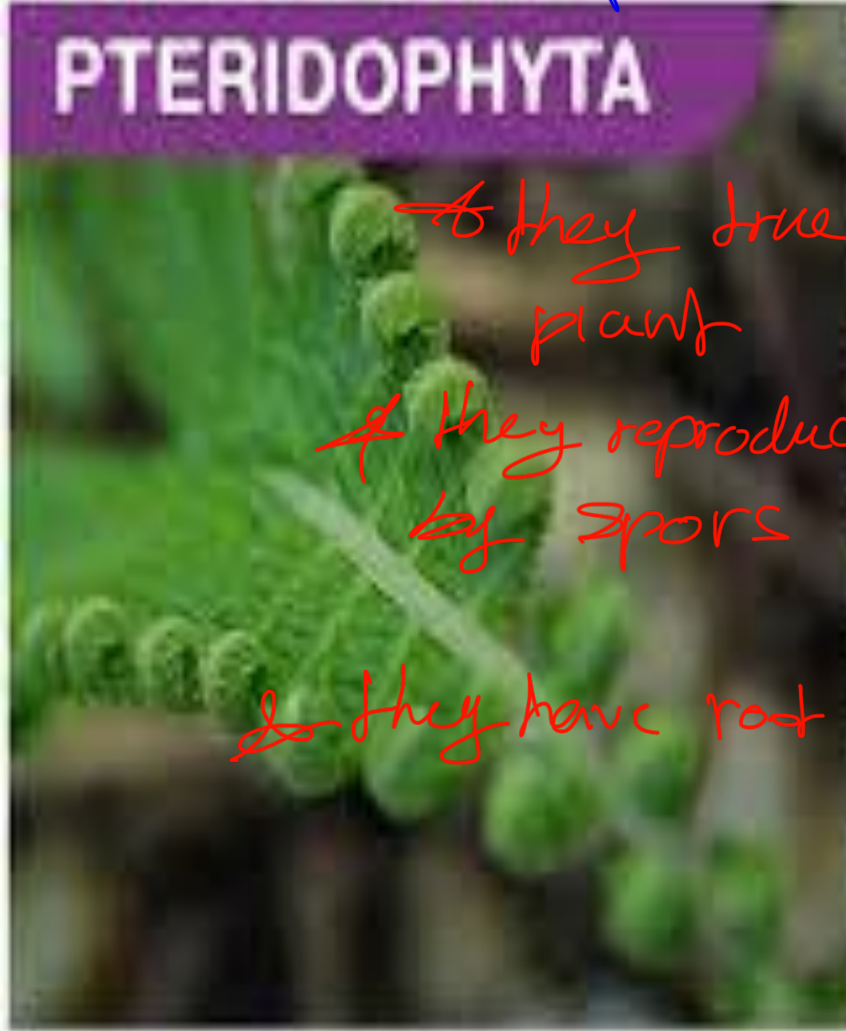
Mosses and liverworts are tiny plants that produce spores instead of flowers and seeds.



PTERIDOPHYTA سرخسیات

از گیاهان
حقیقی
که ریشه دارند

true plant (real roots, leaves and stem) but they reproduce by spores.
they don't have seeds



→ they true plant
& they reproduce by spores
so they have root



1- The **Pteridophyta** includes the Filices (ferns),
Articulatae (^{أذنان الخيل} horsetails) and Lycopsidea
(club mosses). ^{antibacteria}



2- The dried sterile stems of the horsetail ^{أذنان الخيل},
Equisetum arvense are used in herbal medicine
and are listed in the *BHP (British Herbal Pharmacopoeia)*.

Preparations are used
internally to treat inflammation and mild infections of
the **genito**(تناسلي)-**urinary** (بولي) **tract** (UTI).



3- The **spores of lycopodium** (*Lycopodium clavatum*) are
used in **limited extent in medicated snuffs, dusting**
powders and lubricants. As a dusting powder for rubber
gloves it has been known to give rise to **dermatitis**

^{irritation of skin}



Plant Kingdom

Mosses &
Liverworts



Ferns

pteridophyte



Gymnosperms
(Conifers)

*cones bear seeds.
like pines*



Angiosperms
(Flowering
Plants)



2 Types of Seed Plants

- Angiosperms



- Gymnosperms

GYMNOSPERM



a plant that bears seeds in cones, instead of fruit e.g. angiosperms



Spermatophyta(division), **Gymno-** and **angio-**
spermae(subdivision), **mono-** and **dicot**(classes),
-ales (order), **-aceae**(family), X y (**G. spp.**→Latin
name)

1-The **division Gymnospermae** contains many fossil
members. نبات من عصر جيولوجي سالف (متحجرة
في اديم الارض)

2-Of the 11 orders in the Engler classification, it is
only necessary to mention five orders and 10
families (In this course 4 orders and **5 families**).

Example of Gymnospermae

Order	Family
Ginkgoales → to improve memory	Ginkgoaceae
Coniferales	Pinaceae, Cupressaceae
Gnetales use in nasal congestion	Ephedraceae → عمل التخفيف في احتقان الأنف eg. pānada coldan Plk
Taxales	Taxaceae → anticancer

GINKGO ALES

↪ use just leaves.

→ Ginkgoaceae



With the exception of Ginkgo biloba (جینکو)

maidenhair-tree, the plants of this order are found only as fossils. Use these leaves in short term memory.

Ginkgo biloba (leaves) → In recent years, increasing use for the treatment of various diseases associated with the ageing process, (improve short term memory)

→ Diterpenoids (constituents) flavonoids



TAXALES

→ Taxaceae

1- An **order** of **only** → **one** family, which includes the **genera** **Taxus** (10 spp.), *Pseudotaxus*,

2-1 **common yew** **Taxus baccata**
(خشب الطقسوس، رجل الجراداة)

→ produces **valuable wood**.

2-2 **All parts** of the plant are
very poisonous

3- In addition to **alkaloids**, a **cyanogenetic glycoside** and
antitumour agent have been **reported** in the **genus**.



2

RR

4* *Taxus brevifolia* (the Pacific yew)

طاعا بربین علیہ
سقا

4-1 The bark of this species yields the promising

anticancer drug taxol a nitrogenous diterpene.



امط حواء
anti cancer
الحياة



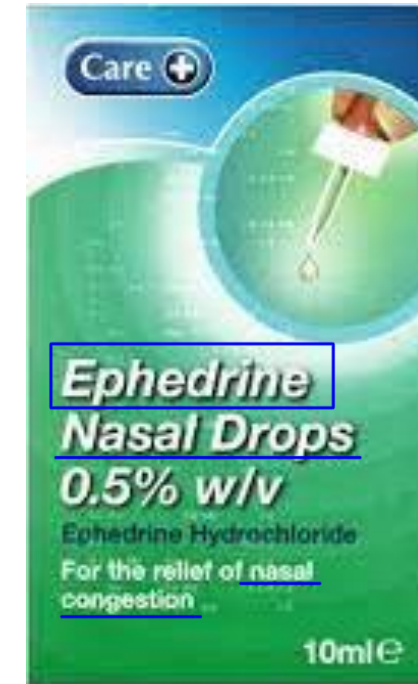
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GNETALES

→ **Ephedraceae** → Nasal congestion

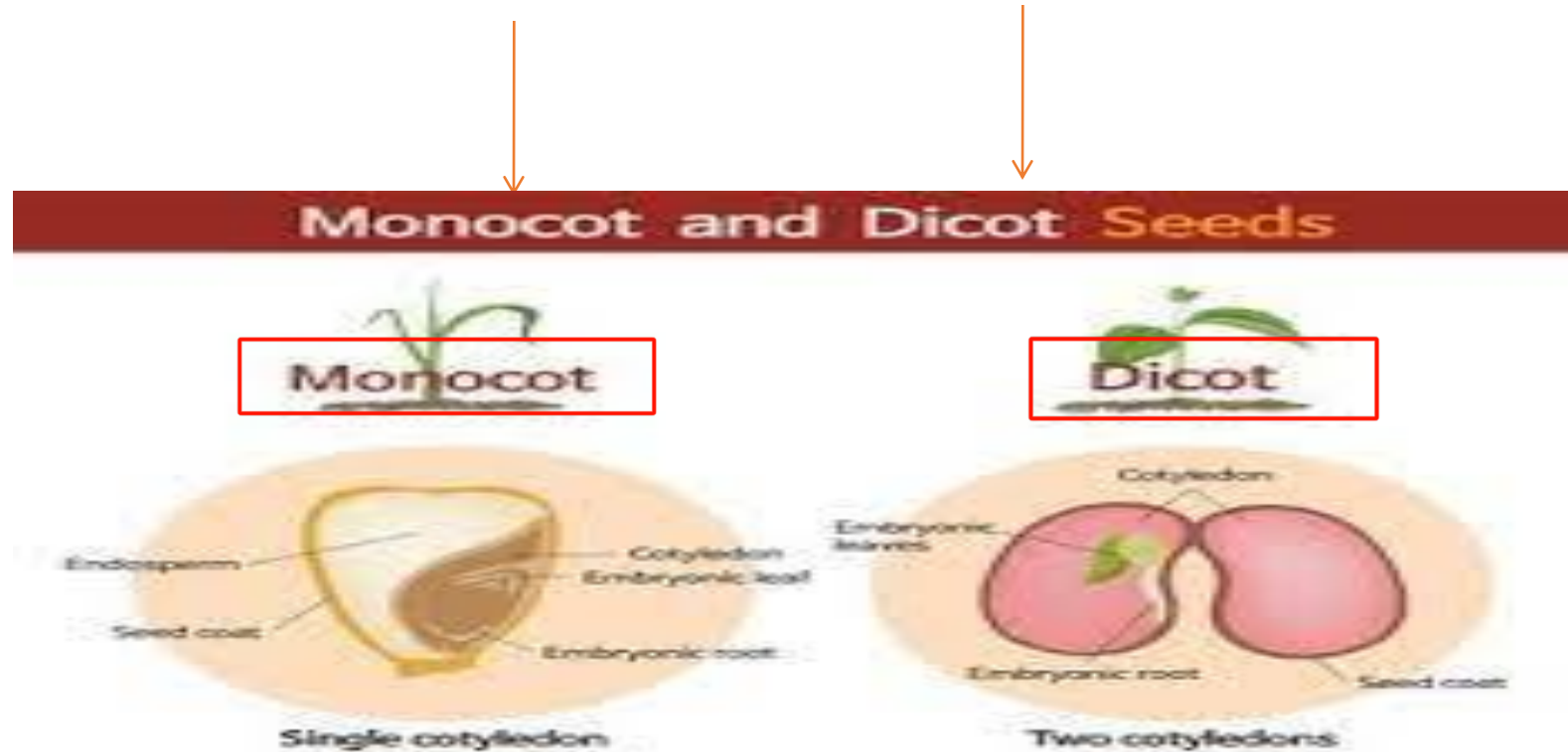
3- Various ***Ephedra*** species **yield** the **drug ephedra**
and the alkaloid ephedrine (Use ?) **nasal congestion!**

Ephedra sinica : ايفيدرا ، ماهوانغ (**ma huang**) → english name of Eph.sinica
Common name.



ANGIOSPERMS

MONOCOTYLEDONS DICOTYLEDONS



Subclass Archichlamydeae

dicot → angiosperma

مطلوب حفظه
family
→ species
→ drugs

2- Salicales :

→ Familie : Salicaceae →

- Salix purpurea (Engl. Name: willow):

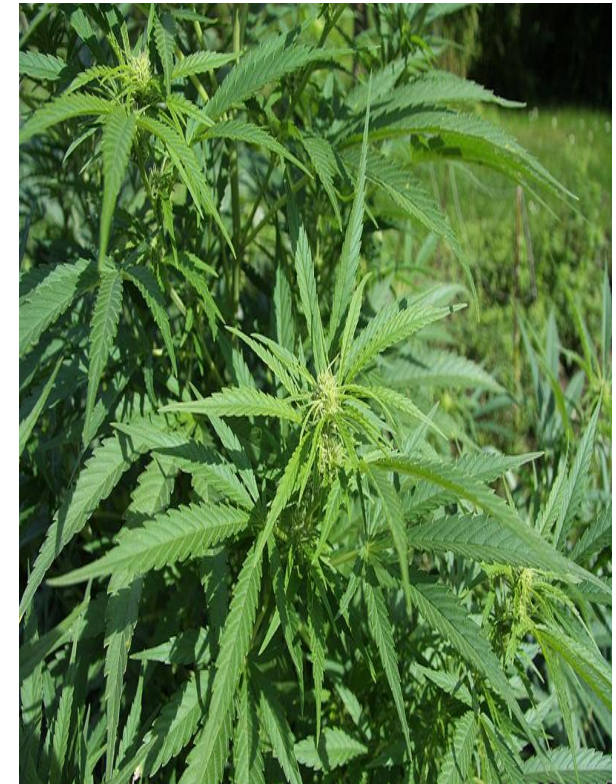
contains Phenolic glycosides → Salicin صفصاف
↳ inactive



diacot / angiosperm.
Cannabinaceae:→ cultivated.

(*Cannabis sativa*→hemp, cannabis) قنب، قنب هندي

- Tetrahydrocannabinol/THC(active ingredient), marijuana(leaves, flowers, resin), hashish(is only the resin of the plant)
resin. (secretion)
بھیرے کے سوا



- Guttiferales

diacot
angiosperm

-1 Theaceae :

Camellia sinensis

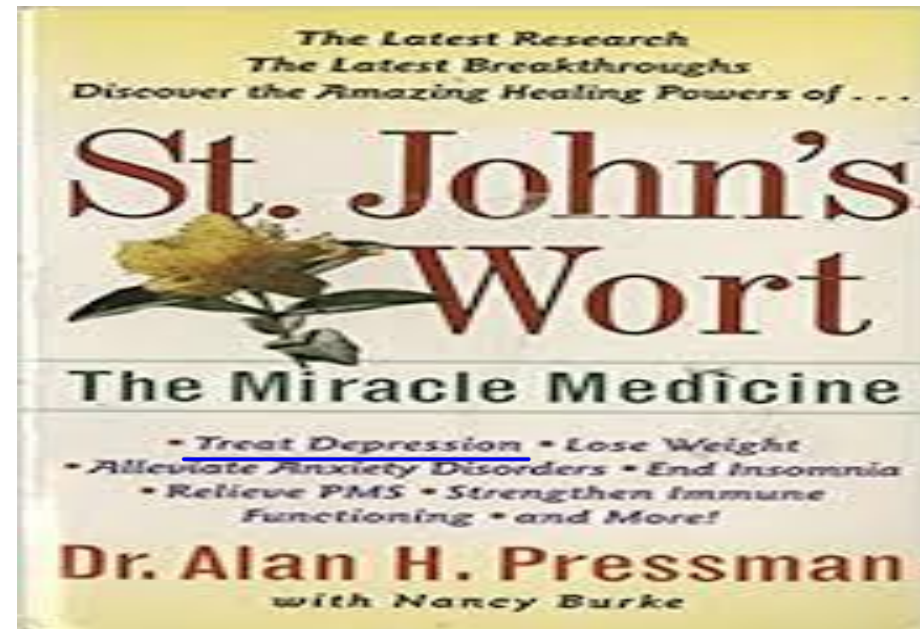
شاي tea (Alkaloids, Saponins,
Tannins)



-2 Hypericaceae: *Hypericum perforatum*

(english: st.john's wort) حشيشة الكبد، روجة

*Used for depression



الأفيون - **Papaver**ales *Opium*

- **Papaveraceae** (rich alkaloids): *Papaver somniferum*,
(white poppy, خشخاش منوم), **Opium**: dried latex (mixture
of compounds, mainly morphine)



- Hippocastanaceae:

Aesculus hippocastanum (Horse chesnut)
(كستناء الهندي، طلة الحصان)
(contains triterpenoid saponins)

لـ علاج الدوالي



Benefits Of Horse Chestnut -

TREAT VARICOSE VEINS



Using the extract of the **Horse Chestnut** in a short form may be considered an effective treatment for varicose veins. All you need to do for this treatment is to take horse chestnut seeds or purchase its gel in the market.

* Celastrales

1- Aquifoliaceae: *Ilex paraguariensis* (Mate)
(مته، شاي مته، شاي بارغواي)

contains alkaloids

لشاي المته تأثير إيجابي فيما يتعلق
بالكوليسترول والقلب وخسارة الوزن
والتورم ومخاطر الإصابة
بالسرطان. Apr 28, 2023
معلومة خارجية من الحفظ



2- Celastraceae: *Catha edulis*

(قات، شاي يماني، شاي تخزين، شاي الحبشة)

contains alkaloids

(khat)

→ CNS stimulant.

→ يحتوي على مواد محبوسة،



-Umbelliflorae



1- Araliaceae: **Hedera helix**(**Ivy**) (contains terpenoid saponins), اللبلاب، جبل المساكين

← الشاذلة Panax ginseng(contains terpenoid saponins)
جنسنگ

2- Umbelliferae= Apiaceae(contains Volatile oil, Resins, coumarins, triterpenoid saponins, alkaloids): **Foeniculum vulgare** شومر (**fennel**), **Pimpinella anisum** يانسون (**aniseed**), **Ammi visnaga** خلّة بلدي (**visnaga**), **Carum carvi** كزبرة (**coriander**), **Coriandrum sativum** كراوية (**caraway**), **Conium maculatum** شوكران (**spotted hemlock**), **Ferula** spp. كلخ

used for various digestive problems including heartburn, intestinal gas, bloating, loss of appetite, and colic in infants



Fennel Medicinal Properties

ضروری نفعی
① طارد للغازات
② هادئ لاسهولام
Carminative, Estrogenic



Main Applications

- Restoring hormonal balance in women
- Promoting digestion

Supportive Compounds

- Anethole
- Coumarin
- Phytoestrogens

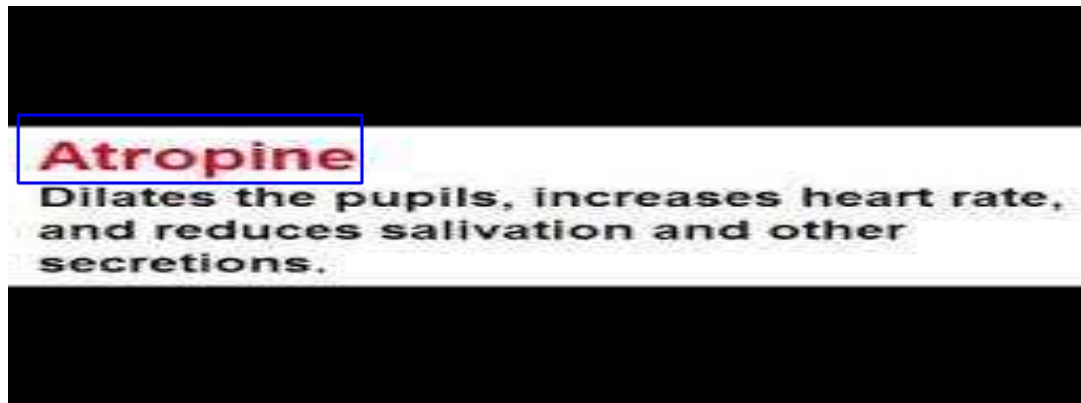
بعض عدم التوازن
لأنه هرمون كان
في حالة عدم التوازن

Medicinal Actions

Fennel seeds are high in **phytoestrogens**, which can help **reduce the effects of hormone imbalances** due to premenstrual syndrome (PMS) and menopause. **Anethole** is antimicrobial and antifungal, whereas **coumarin** suppresses appetite in the short term. Both compounds help relieve gas, bloating, and stomach pain.

* Solanaceae:

Datura stramonium داتورة (datura, thornapple), **Atropa belladonna** ست الحسن, **Hyoscyamus** فيها hyoscyamine بـ أدوية المخدرات.
niger (henbane) **Nicotiana tabacum** تبغ (tobacco),
Solanum spp., **Capsicum spp.** (شطة) أنواع فليفلة



هذا الدواء
يعمل



	Seed	Root	Vascular	Leaf	Flower
MONOCOTS	 One cotyledon	 Fibrous roots	 Scattered	 Parallel veins	 Multiples of 3
DICOTS	 Two cotyledon	 Tap roots	 Ringed	 Branched veins	 4 or 5

السيقان المتوازية

فلقة

خلفتين

MONOCOTYLEDONS

* As the name indicates, monocotyledons have an embryo with one cotyledon.

1- Liliiflorae

1-1 Liliaceae: Allium sativum (garlic),
Aloe vera (aloe) صبار



للعلاج النعوص
(acute gaot)
3) Colchicum autumnale (autumn crocus or meadowsaffron)
عيصلان، كلاح

گینا لہو + صفا



٥

- Graminea=Poacea: **Oryza sativa** رز,

Zea mays ذرة,

Triticum aestivum قمح



A thick pink oval border surrounds the text.

ANIMAL PRODUCTS

As with the Plant Kingdom, animals are classified into Phyla, Classes, Orders, Families, Genera and Species. Although the **number** of pharmacognostical products derived from **animal sources** is limited there has been, in recent years, an immense interest in the chemistry of many marine creatures as potential sources of drugs and biologically active materials. In this respect much **research** has been **published** on the simpler marine organisms.

Listed below are selected animal phyla which embrace species of interest (the many animal products used in traditional medicines of Africa, India and the Orient are not included).

ARTHROPODA مفصليات

A very large phylum of jointed animals including the crustaceans, insects and arachnids.

القشريات
Exs: Shrimps, crabs, lobsters
مرطبات البحر

bees

البركيات

جراثيم البحر

- **Class Crustacea** includes the shrimps, crabs, lobsters. Of little medicinal significance, nevertheless **brine shrimps** are being increasingly used in place of higher animals for the preliminary testing of phytochemical for toxicity

نستخرج
لغرض اختبار
toxicity for any compound



Class insecta:

1-order Hemiptera (Bugs):

الحنظل القرمزية

The cochineal beetle is an important colourant.

Cochinal is the dried female insect Coccus cacti L.

حشرة القرمز



2-Order coleopteran (Beetles): Beetles of the genus Cantharis, known as blistering beetles, possess vesicant properties and preparations of Cantharis vesicatoria were at one time used in Western medicine in the form of plasters as rubefaciants. Their use continues in the traditional medicine of Eastern Asia.

→ redness skin.

irritation
in skin (vasodilation)
&
warmth.





3. Order Hymenoptera (Ants, bees, etc.):

→ products derived from Apis mellifica include honey, beeswax, royal jelly and propolis



4. Order Diptera (^{ذباب}Flies, ^{الجوهر}gnats and ^{البراغيث}midges):

The successful use of maggots in the treatment of **wounds infected with antibiotic-resistant Staphylococcus aureus** has received recent attention.

→ Sterile larvae of the common green bottle **Lucilia sericata** are used.

