

## Lycopodium

### ليكوپوديوم - الكبريت النباتي

- Lycopodium consist of the spores of the clubmoss
- Latin name: *Lycopodium clavatum*
- Family; Lycopodiaceae, Pteridophyta
- Lycopodium is a light, yellow, extremely mobile powder about 40 µm diameter, have shape of a three sided pyramid with convex base, without odour or taste.
- It floats on water without being wetted.

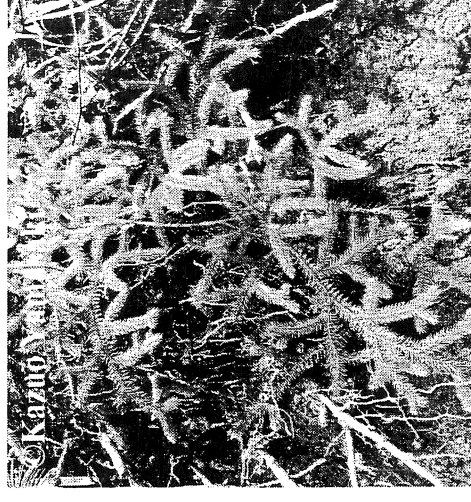
## Constituents

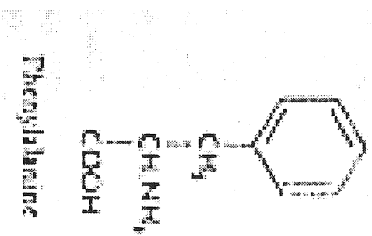
- 10-18% volatile oil
- A crystalline substance cubebin and other lignans
- 1% White amorphous substance cubebic acid
- 3% Amorphous resin

## Constituents of Lycopodium

- 50% fixed oil
- 3% sugars
- Alkaloids such as lycopodine (like pelletierine).
- Lycopodium was once used in dusting powders and medicated snuff, and as a dusting powder for pills.

## Lycopodium clavatum

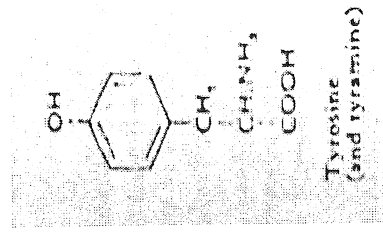




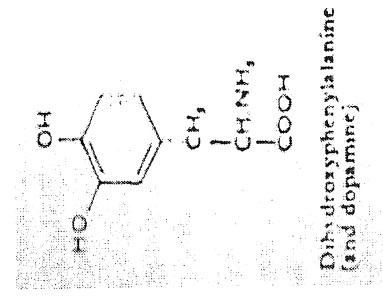
Phenylalanine-, Tyrosine- and  
Dihydroxy phenylalanine-derived  
Alkaloids

## Protoalkaloids

- Those alkaloid-like amines which do not have the nitrogen as part of heterocyclic ring system are often termed protoalkaloids, they are not restricted to any particular class of alkaloids.

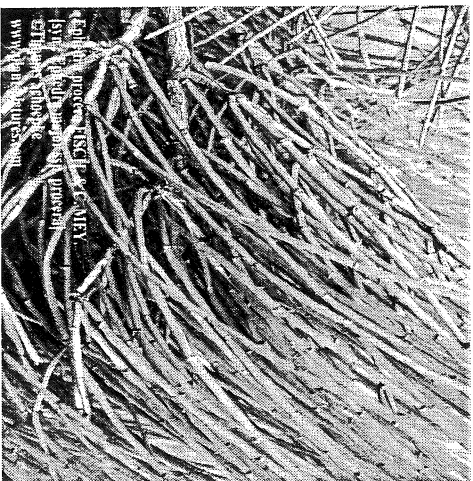
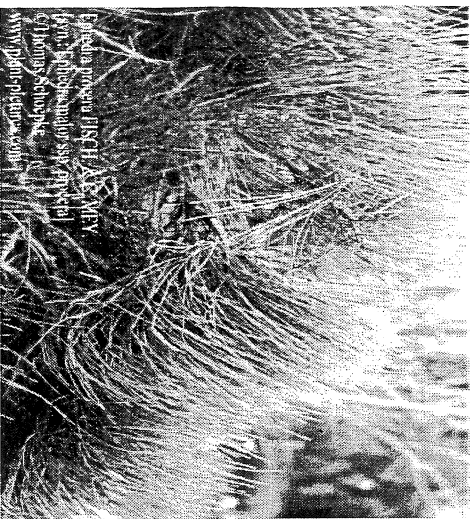


Tyrosine  
(and tyramine)



Dihydroxyphenylalanine  
(and dopamine)

## Ephedra

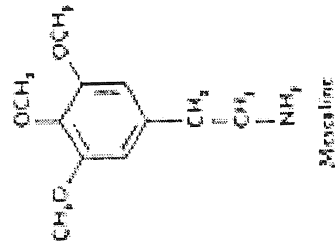
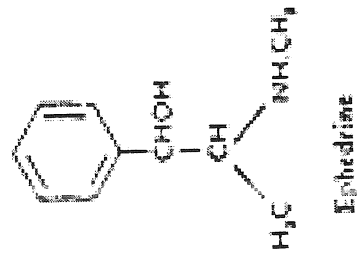


## Ephedra الافدر ا

- Latin name; *Ephedra sinica*, *Ephedra equisetina*
- Family; Ephedraceae الافدرية
- Origin; Europe and Mediterranean countries
- Used parts: The stems have longitudinal ridges, ashy grayish-green in colour, and slightly rough.

## Constituents

- The ephedras contain about 0.5-2.0% of alkaloids. Ephedrine is the main active compound. Pseudo ephedrine is also present. The roots also contain a number of macrocyclic alkaloids (ephedrines) and feruloylhistamine which have hypotensive properties.



القث

## Khat or Abyssinian tea

- Latin name; *Catha edulis*
- Family; Celastraceae الحرايبية
- Origin; East and southern Africa, southern Arabia.
- Used parts: The leaves and young stem heads.

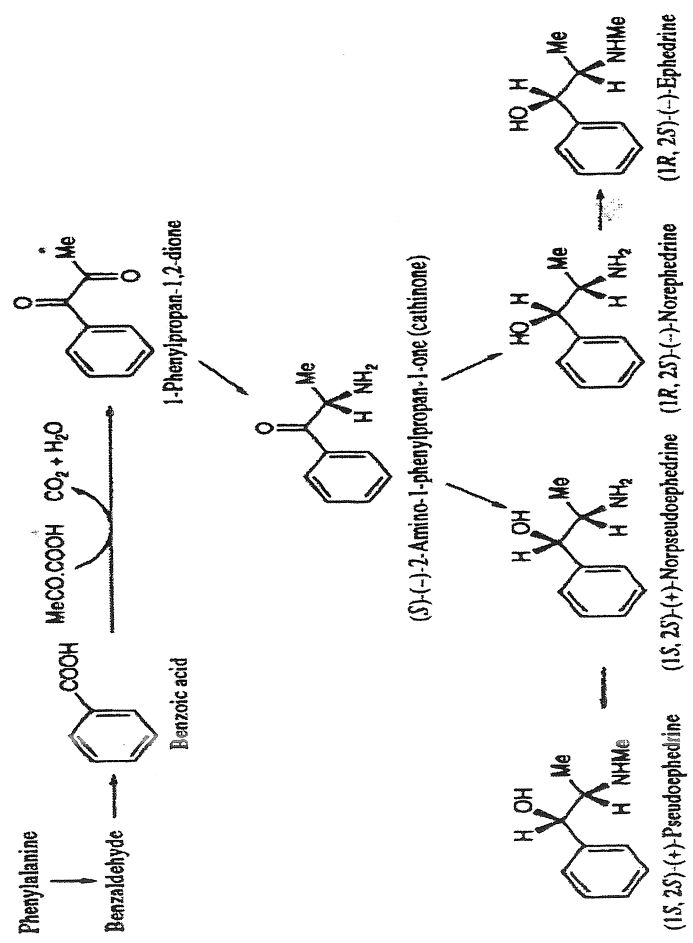
## Uses

- Ephedrine is used for:
- 1. The relief of asthma and hay fever. الربو

وحمى القش

# Constituents

- 1.0% norpseudoephedrine in the dried leaves.
- Cathinone is considered the principal CNS stimulant of the fresh plant and has pharmacological properties analogous to those amphetamine, possessing a similar potency and the same mechanism of action.
- Essential oil



Phenylalanine

Benzaldehyde

MeCO<sub>2</sub>COOH

CO<sub>2</sub> + H<sub>2</sub>O

Benzoic acid

1-Phenylpropan-1,2-dione

(S)-(-)-2-Amino-1-phenylpropan-1-one (cathinone)

(1S, 2S)-(+)-Pseudoephedrine

(1S, 2S)-(+)-Norpseudoephedrine

(1R, 2S)-(-)-Norephedrine

(1R, 2S)-(-)-Ephedrine



## Opium poppy

الخشخاش المنوم

- Latin name; *Papaver somniferum*
- Used Parts; Capsules, seeds
- Family; Papaveraceae الخشخاشية

## Benzylisoquinoline derivatives

Opium poppy

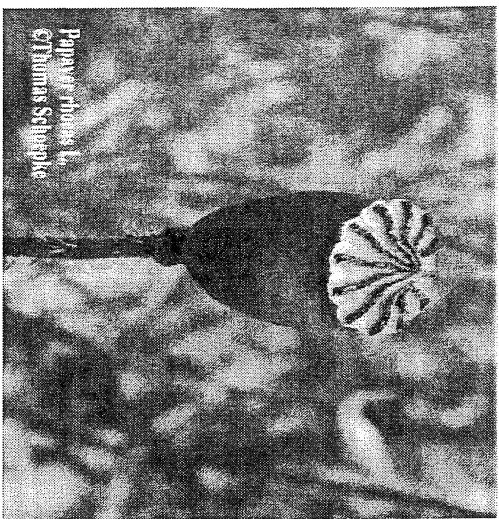
## Spices of Opium poppy

3. *P. somniferum* var. *nigrum*, الخشخاش المنوم, الخشخاش الأسود cultivated in Europe for the seeds, which are slate-colored and are known as maw seeds; flowers violet.
4. *Papaver rhoeas* الوردي الخشخاش (red or corn poppy); fresh scarlet petals were used as a colouring matter in the form of syrup.

## Spices of Opium poppy

1. *P. somniferum* var. *glabrum*, cultivated in Turkey; flowers purplish but sometimes white; capsule subglobular, seeds, white to dark violet.
2. *P. somniferum* var. *album* الخشخاش المنوم الأبيض; cultivated in India; flowers and seeds white, capsule egg-shaped.

## Spices of Opium

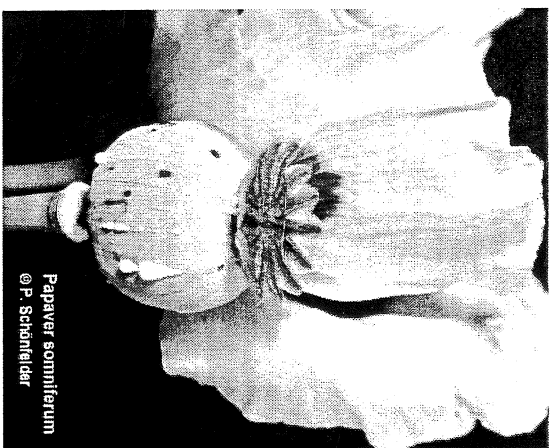


*Papaver rhoeas* L.  
© Thomas Schoepke



*Papaver album* L. siber.  
*album* (LERSCHTE) NYMAN  
© Thomas Schoepke  
[www.plant-cape.de/es.com](http://www.plant-cape.de/es.com)

## Spices of Opium



*Papaver somniferum*  
© P. Scheffelder



*Papaver somniferum* L.  
© Thomas Schoepke

## Opium

- Opium (Raw Opium) is the latex obtained by incision from the unripe capsules of *Papaver somniferum*, Papaveraceae, and dried partly by spontaneous evaporation and partly by artificial heat.
- Opium has irregularly-shape and is known in commerce as Indian opium.

## Constituents

- Poppy capsules contain, when ripe, about 0.28% of morphine.
- Poppy seeds only small quantities of narcotine, papaverine and thebaine in addition to morphine and codeine.
- *Papaver rhoeas* (red or corn poppy); They contain the anthocyanidin glucoside mecocyanin, Alkaloids such as rheoadine; they have no morphine-like activity.

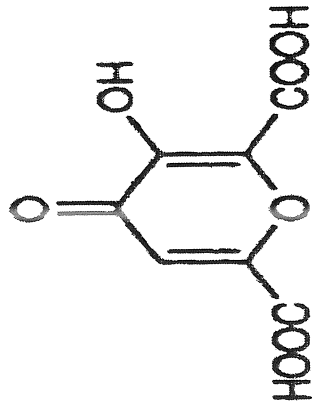
## Microscopy of Opium

- Agglomerated latex granules in irregular masses.
- Pointed trichomes and a few starch grains.

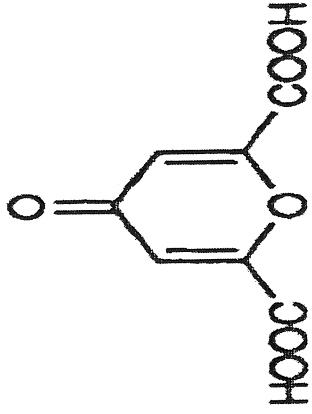
## Opium

- The BP monograph states that opium is intended only as a starting material for the manufacture of galenical preparations.
- Opium BP is required to contain not less than 10% of morphine and not less than 2.0% of codeine. The thebaine content is limited to 3%.

## Opium



Meconic acid

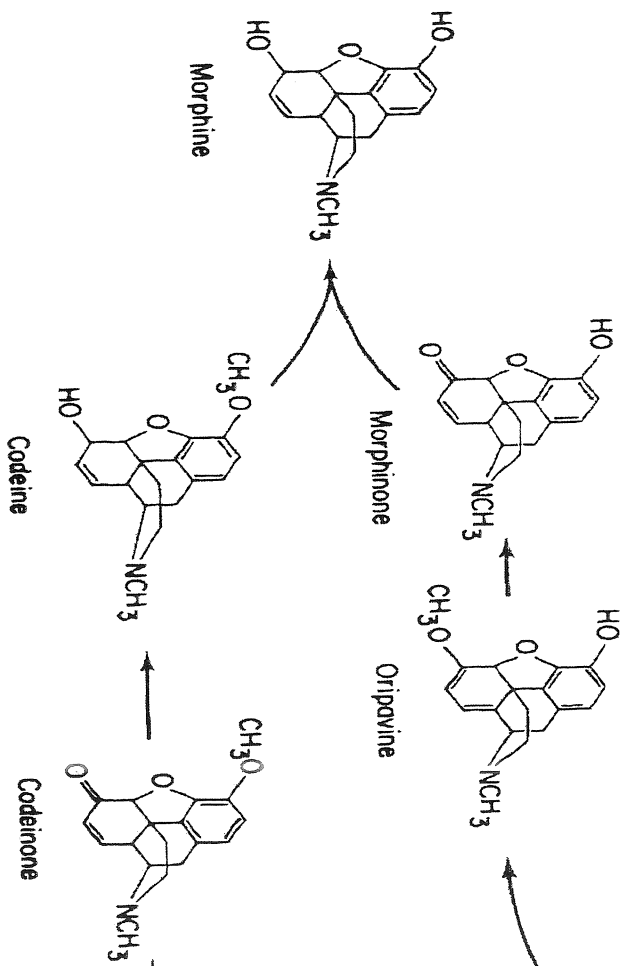
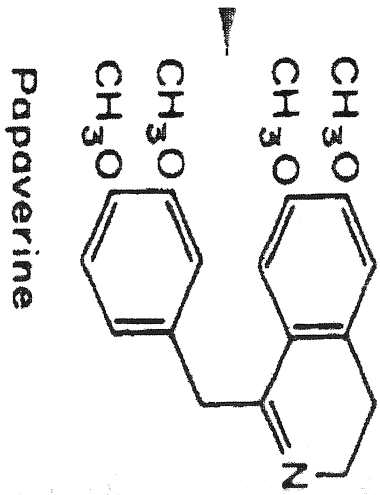


Chelidonic acid

## Constituents

- About 30 Alkaloids combined with the organic acid meconic acid and are listed in six principal alkaloids.
- The first group is morphine group; it consist of alkaloids which have a phenanthren nucleus.
- Papaverine group has a Benzylisoquinolines structure.

# Opium



## Papaveretum BP

- Papaveretum BP is also contained the opium alkaloid noscapine but this has now been removed from the preparation on account of its genotoxicity.
- Noscapine has also been a constituent of many cough mixture and these have now been withdrawn by the manufacturers.

## Papaveretum BP

- Papaveretum BP is a mixture of the hydrochlorides of opium alkaloids containing 88% anhydrous morphine HCl, 9% papaverine HCl and 7% codeine HCl.
- Well-known preparations of papaveretum are used mainly for premedication and as analgesics during and after operations.



## Uses

- Opium exerts its action more slowly and is therefore preferable in many cases (such as in the treatment of diarrhea)
- Opium is also used as a diaphoretic.
- The habitual use of codeine may produce constipation.

## Uses

- Opium and morphine are widely used to relieve pain and are used as hypnotics.
- Codeine is milder sedative than morphine and is useful for allaying coughing.
- Both morphine and codeine decrease metabolism, and the later, was used for the treatment of diabetes.

# Drugs contain Benzylisoquinoline derivatives

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# Drugs contain

## Alkaloids

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## Characters

- The drug consists of cylindrical rhizomes (1-5 cm long, 2-10 cm diameter)
- The drug breaks with a short, waxy fracture.
- The drug has a slight but distinctive odour and bitter taste.

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## Hydrastis خاتم الذهب

- English name; Golden Seal, yellow Root
- Used parts; dried rhizome and roots
- Latin name; *Hydrastis canadensis*
- Family; Berberidaceae الزر كشيبة
- Small perennial plant
- Origin; eastern Canada and USA

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## Uses

- The use of hydrastis
- 1. to check uterine hemorrhage (الضبط النزف الرحمي)
- 2. As a bitter stomachic
- 3. Locally in the treatment of catarrhal (نزلي) conditions of genito-urinary tract
- 4. Hydrastine hydrochloride and hydrastinine have been used in various forms to control uterine haemorrhage

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## Constituents

- Hydrastis contains the alkaloids hydrastine, berberine and canadine.
- Commercial samples yields about 4% of hydrastine and 6% of berberine.
- Berberine is responsible for activity against multiple drug resistant Mycobacterium tuberculosis

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## Ipecacuanha

عرق الذهب

- Used part; Ipecacuanha of the BP is the dried root or rhizome and root of *Cephalis ipecacuanha* (Latin name).
- Family; Rubiaceae
- Ipecacuanha should contain a minimum of 2% of ether –soluble alkaloids.
- *C. ipecacuanha* is a shrub 20-40 cm high
- Origin; Brazil and other Latin America.

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## Tetrahydro-isoquinoline Monoterpene Alkaloids and Glycosides

- These alkaloids and alkaloid-glycosides derive from the condensation of dopamine with secologanin (a C10 monoterpene) to give two series of compounds.

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## Constituents

- Ipecacuanha contains the alkaloids emetine, cephaline, psychothrine, psychothrine methylether and emetamine (isoquinoline derivatives).
- Ipecoside, alagiside which are isoquinoline glucosides.
- Iridoid glycosides sweroside and 7-dehydrologanin.
- Ipecacuanhin and ipecacuanhic acid.

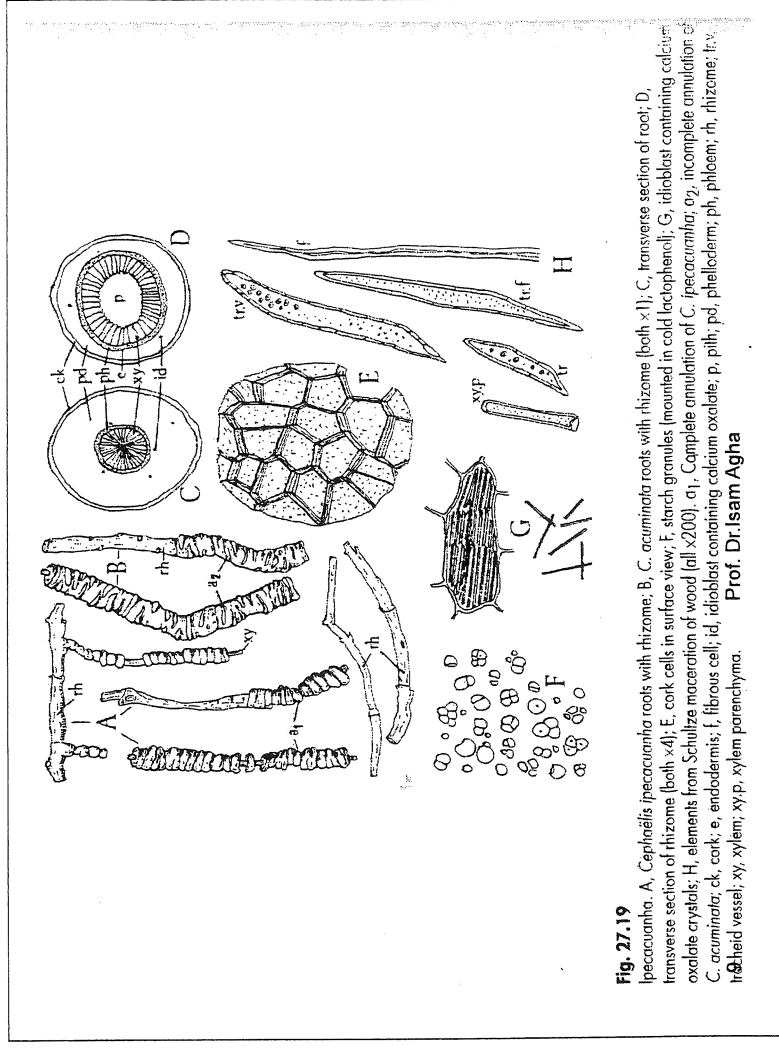


Fig. 27.19

Cephaelis ipecacuantha roots with rhizome; B, C. acuminata roots with rhizome [both x1]; C, transverse section of root; D, transverse section of rhizome [both x4]; E, starch granules, mounted in cold lactophenol; G, idioblast containing calcium oxalate crystals; H, elements from Schultz maceration of wood [all x200]. a1, Complete annulation of C. ipecacuantha; a2, incomplete annulation of C. acuminata; ck, cork; e, endodermis; f, fibrous cell; id, idioblast containing calcium oxalate; p, pith; ps, phlocladem; ph, phloem; rh, rhizome; tr, tracheid vessel; xy, xylem; xyp, xylem parenchyma.