

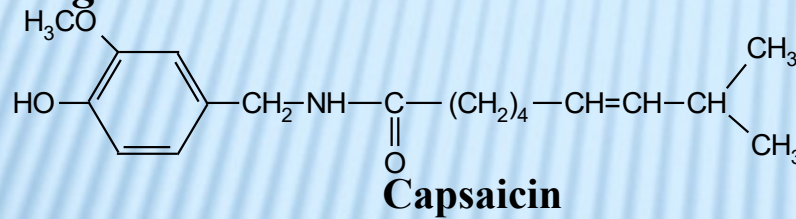
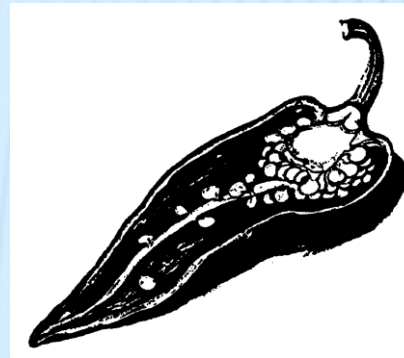
*Medicinal plant containing  
**PROTOALKALOIDS***

**CAYENNE PEPPER – CAPSICI ACRIS FRUCTUS**  
**CAYENNE PEPPER - CAPSICUM ANNUUM**  
**FAM. - SOLANACEAE**

*DAB, PH. Hely., Ph. Eur*



*Spiny, red or brownish red, 1-7 cm (mostly 2-4cm) long, conical fruits that are straight or slightly curved. The inside is dull red with numerous blisters. The discoid seeds are yellow and 2-4mm in width. Odor weak and characteristic. Test intensively pungent and burning.*



**Act. Const.**

0,3-1% capsaicinoids, ascorbinic acid, fatty oils, carotenoids, volatile oil.

**Uses**

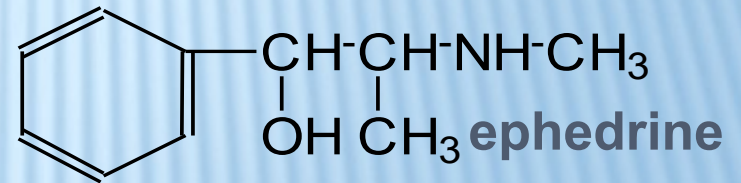
**Topically in form ointments, liniments or plasters. Painful muscle spasms in shoulder and arm region and spine of adults. Duration of administration no longer than 2 days. 14 days must pass before a new application.**



**EPHEDRA HERB- HERBA EPHEDRAE**  
**EPHEDRA - EPHEDRA EQUISETINA**  
**FAM. - EPHEDRACEAE**



It is cultivated in India and Pakistan  
The drug is collected in the autumn, this being important, as the amount of alkaloid present shows considerable variation at different seasons. The stem is branched, bearing numerous longitudinal ridges, yellowish-green colour. The leaves are small of brownish purple colour.



**Act. Const.**

0,5-2% alkaloids

**Uses**

Ephedrine is a potent **sympathomimetic**. It stimulates adrenergic receptors. It excites sympathetic nervous system, causes vasoconstriction and cardiac stimulation. It is used for the relief of asthma and hay fever. Its action is more prolonged than that of adrenaline and it has the further advantage that it need not be given by injection but may be administered by mouth.

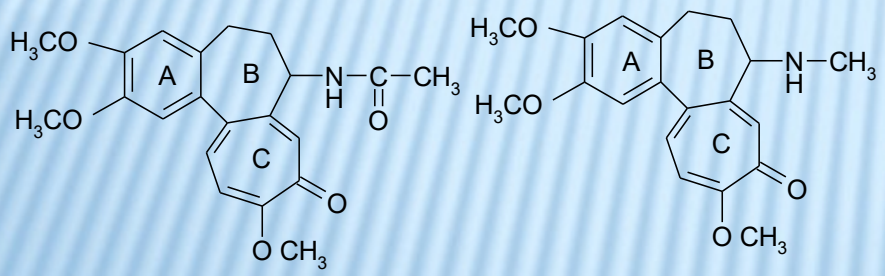


# COLCHICUM CORM - BULBOTUBERA COLCHICI RECENS COLCHICUM - COLCHICUM AUTUMNALE FAM. - MELANTHIACEAE

The plant is cultivated in England, central Europe and northern Africa. It is collected in spring.

**Act. Const.**

**Colchicine up to 0,8%**



Colchicine

Colchamine



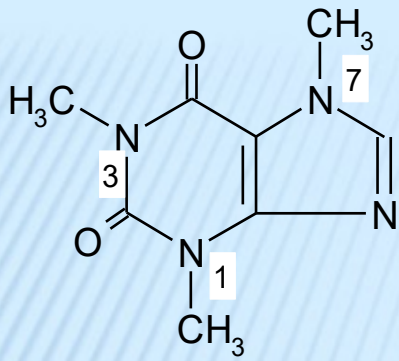
## Uses

It can affect the dispersal of tumors. It is used in the treatment of various neoplastic diseases.

**☹️ Poisonous plant material!**

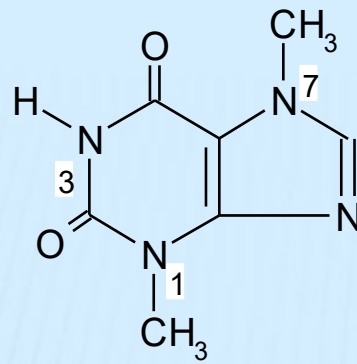
*Medicinal plant material containing*  
**PURINE ALKALOIDS**





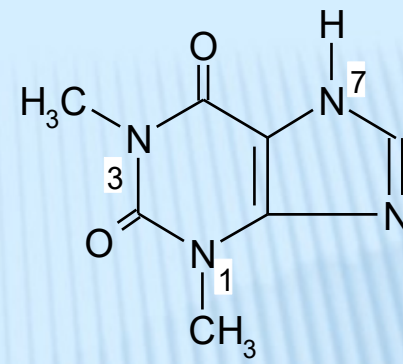
Caffeine

1,3,7-trimethylxanthine



Theobromine

1,7- dimethylxanthine



Theophylline

1,3-dimethylxanthine

The purines are derivatives of a heterocyclic nucleus consisting of the 6-membered pyrimidine ring fused to the 5-membered imidazole ring. Purine itself does not occur in nature, but numerous derivatives are biologically significant.

The pharmaceutically important bases of this group are all methylated derivatives of 2,6-dioxypurine (xanthine). Caffeine is 1,3,7-trimethylxanthine, theophylline is 1,3-dimethylxanthine, and theobromine is 3,7-dimethylxanthine.



**Caffeine or 1,3,7-trimethylxanthine** occurs in coffee, tea, cacao, guarana, kola, and mate. Although caffeine can be produced synthetically, it is usually prepared from tea, coffee, tea dust.

Caffeine is a central nervous system stimulant.

**Theophylline or 1,3-dimethylxanthine** is prepared synthetically from caffeine or by other means.

Theophylline is utilized principally as a smooth muscle relaxant for the symptomatic relief or prevention of bronchial asthma. In addition, theophylline possesses diuretic properties.

**Theobromine or 3,7-dimethylxanthine** is a compound prepared from the dried, ripe seed of *Theobroma cacao*, or is made synthetically. Theobromine is a diuretic and a smooth muscle relaxant. It has little stimulant action on the central nervous system and hence is preferred over caffeine in treatment of cardiac edema and of angina pectoris.



**TEA LEAF- FOLIA THEAE**  
**TEA -THEA SINENSIS (CAMELIA SINENSIS)**  
**FAM. - THEACEAE**

*Act. const.*

- ↳ **alkaloids: coffeine (1,5-5%), theophylline, theobromine**
- ↳ **tannins 20-25%,**
- ↳ **flavonoids,**
- ↳ **a volatile oil 0.75%**



*Uses*

The stimulating action of tea is essentially that of the contained caffeine; its astringent properties are owing to the tannin content. Tea leaf waste and tea dust represent important sources for the extraction of caffeine.



# COFFEE BEAN OR COFFEE SEED - *SEMINA COFFEA*

## COFFEE - *COFFEA ARABICA*

### FAM. - *RUBIACEAE*

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#### *Act. Const.*

- ↳ Alkaloids - 1 -2% of caffeine, 0, 25% of trigonelline (N-methylbetaine of nicotinic acid),
- ↳ Tannin - 3 to 5% ,
- ↳ Glucose and dextrin 15%;
- ↳ Fatty oil consisting chiefly of olein and palmitin 10 -13%;
- ↳ Proteins 10 – 13%.

#### *Uses*

The action of coffee depends principally on the caffeine, which acts on the central nervous system, the kidneys, and the heart.





**COCOA SEEDS - SEMINA CACAO**  
**COCOA - THEOBROMA CACAO**  
**FAM. - STERCULIACEAE**

*Act. const*

- ✦ **Alkaloids:** theobromine progressively increases during fermentation to reach 3% , caffeine (0,05-0,36%), theophylline,
- ✦ **Fatty oil,**
- ✦ **Anthocyanidins.**



*Uses*

**Theobromine** – diuretic, smooth muscle relaxant. It has little stimulant action on the central nervous system; Medicinal cocoa butter has for a long time been used in suppositories or ointments. Cocoa powder can flavour or correct the taste of medicines.





**COLA NUT - COLAE SEMEN**  
**COLA - COLA NITIDA**  
**FAM. - STERCULIACEAE**

*Act. const*

- ✦ **Alkaloids: caffeine and other xanthines**
- ✦ **Tannins**



*Uses*

Central nervous system stimulant, antidepressant, diuretic, and antidiarrheal effects, mental and physical fatigue.

**GUARANA PASTE – PASTA GUARANA**  
**GUARANA – PAULLINIA CUPANA**  
**FAM. - SAPINDACEAE**

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*Act. const*

- ✦ **Alkaloids: caffeine and other xanthines**
- ✦ **Condensed tannins**

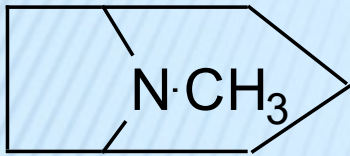


*Uses*

On the basis of its caffeine content, guarana is used as a psychostimulant and for temporary relief of physical and mental exhaustion, and therefore also as a component in various tonics.

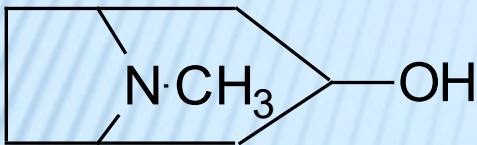


*Medicinal plant material containing  
**TROPANE ALKALOIDS** (piperidine/N-  
methyl-pyrrolidine)*

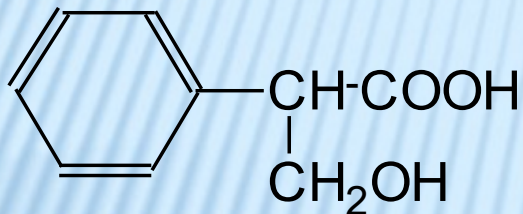


***Tropane***

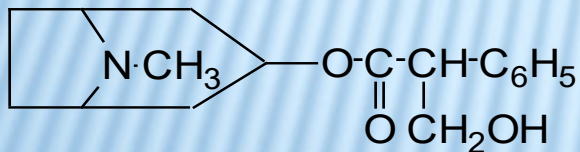
Tropane is a dicyclic compound formed by the condensation of a pyrrolidine with 3 acetate-derived carbon atoms.



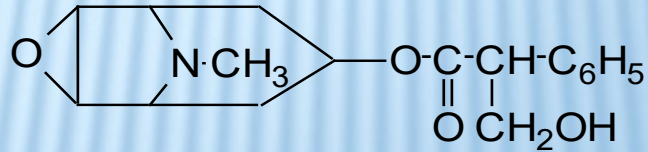
***Tropine***



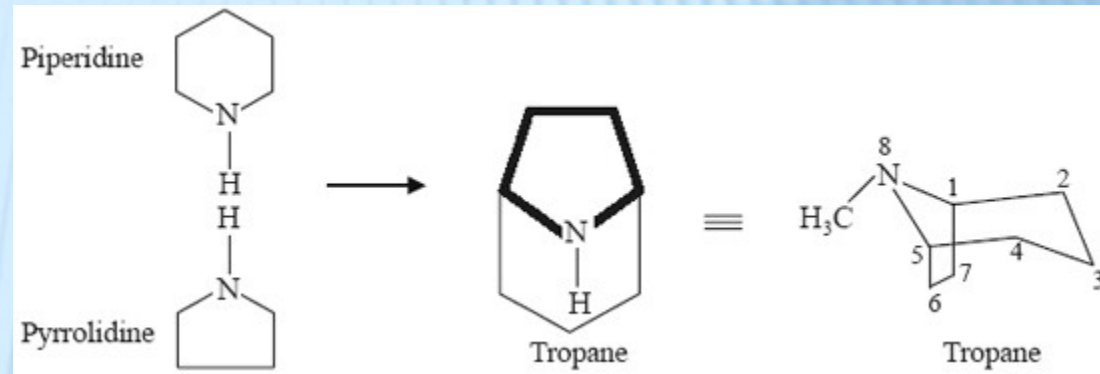
***Tropic acid***



***Atropine (±) or Hyoscyamine(-)***



***Scopolamine (Hyoscine) (-)***





× **Vitali - Morin test:**

- × Treatment with fuming nitric acid for a few minutes followed by addition of methanolic potassium hydroxide results in a **bright purple colour**.

### Uses.

- × Hyoscyamine and hyoscine are **mydriatics**. They have **antispasmodic, antisecretory effect, relieve spasms of the bowel, and reduce respiratory secretions**, reduce such secretions as: saliva, sweat, and gastric juice (anticholinergic).
- × **Atropine** has a stimulant action on the central nervous system and depresses the nerve endings to the secretory glands. Can be used as an antidote in opium and chloral hydrate poisoning
- × **Hyoscine** (scopolamine) has sedative and tranquillizing effects and is used for alleviation of motion sickness.
- × **Hyoscyamine** is an antispasmodic and may be used for the treatment of bronchial asthma.

# STRAMONIUM LEAF - FOLIA STRAMONII

## STRAMONIUM - DATURA STRAMONIUM

### FAM. - SOLANACEAE

The plant is widespread in the Old and New Worlds.

The dried leaves are grayish green in colour, thin, brittle, twisted, and often broken. Whole leaves are 8-25 cm long and 7-15 cm wide; they are shortly petiolate, ovate or triangular ovate in shape, are acuminate in the apex and have a sinuate –dental margin. It has a slight but unpleasant odour, and a bitter taste.

#### *Act. Const.*

↳ 0,2-0,45% of alkaloids, the chief of which are hyoscyamine and hyoscyne, but a little atropine may be formed by racemization.

#### *Uses*

Atropine has a stimulant action on the central nervous system and depresses the nerve endings to the secretory glands and plain muscle. Hyoscyne has sedative properties.

‘*Scopolamine hydrobromide*’ is used in preoperative medication. «*Astmatin*», «*Astmatol*» are used as antiasthmatic cigarettes; *Oil Stramonium (Oleum Stramonii)* - as analgesics.





**DATURA FRUIT – FRUCTUS DATURAE INNOXIAE**  
**DATURA SEED– SEMEN DATURAE INNOXIAE**  
**DATURA - DATURA INNOXIA**  
**FAM. - SOLANACEAE**

The ripe fruit is a thorny capsulae about 3-4cm long.  
Seeds are brown in colour reniform in outline and about 3-4mm long

*Act. Const.*

- ↳ **Tropane alkaloids : chiefly hyoscyamine and hyoscine,**
- ↳ **nicotin**



*Uses*

**Fruit and seeds – source of pure alkaloids.**

**‘Scopolamine hydrobromide ‘ – as sedative ; ‘Aeron’ (mix of salts of hyoscyamine and hyoscine) is used to treat sea sickness.**



**BELLADONNA LEAF - FOLIA BELLADONNAE**  
**BELLADONNA HERB- HERBA BELLADONNAE**  
**BELLADONNA ROOT - RADICES BELLADONNAE**  
**BELLADONNA - ATROPA BELLADONNA**  
**FAM. - SOLANACEAE**

*Atropa belladonna* is cultivated in Europe and USA .

The leaves on the upper branches are in pairs, a large leaf and a smaller one. The flowers are solitary, about 2,5 cm long; the corolla is five-lobed and of a dull purplish colour. The five lobed calyx is persistent , remaining attached to the purplish black berry.

**Act. Const.**

**0,3-0,6% alkaloids, the chief of which is hyoscyamine**

*Uses*

***Tincture of leaves; dry extract; tablets Becarbon, Besalol, Bellataminal, suppositories «Betiol», - spasmolytic and analgesic; «Atropine sulphate» - anticholinergic drug***





**HENBANE LEAF - FOLIA HYOSCYAMI**  
**HENBANE - HYOSCYAMUS NIGER**  
**FAM. - SOLANACEAE**

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The plant is cultivated in Europe and USA. The Eur. Ph. description refers to petiolate as well as sessile leaves. The leaves are more or less broken but are characterized by their grayish-green colour, very broad midrib and great hairiness. If not perfectly dry, they are clammy to the touch, owing to the secretion produced by the glandular hairs.

*Act. Const.*

↳ **Tropane alkaloids :**  
**chiefly hyoscyamine and hyoscine.**

**The petiole contains more alkaloids than the lamina or stem.**

*Uses*

***Henbane oil - Oleum Hyoscyami* – analgesic, (neuralgia, rheumatism);**

**Leaves are a component of «*Astmatin*», «*Astmatol*».**



**SCOPOLIA RHIZOMES - RHIZOMATA SCOPOLIAE  
CARNIOLICAE  
SCOPOLIA - SCOPOLIA CARNIOLICA  
FAM. - SOLANACEAE**

*Scopolia carniolica* is central and eastern European species somewhat smaller than belladonna.

**Act. Const.**

- ↳ **Tropane alkaloids** : chiefly **hyoscyamine** and **hyoscine**,
- ↳ **coumarins**: **scopoletin**



**Uses**

Scopolia rhizomes are the source of pure alkaloids. '*Scopolamine hydrobromide*' is sedative ; '*Aeron*' is used to treat sea sickness.



# COCA LEAVES – FOLIUM COCAE

## COCA PLANT – ERYTHROXYLUM COCA

### FAM. – ERYTHROXYLACEAE

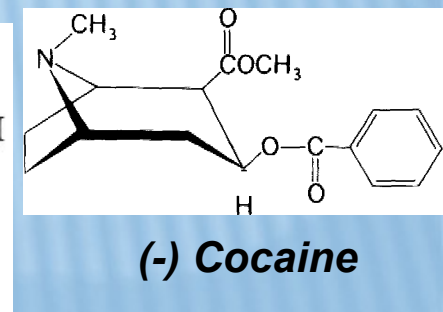
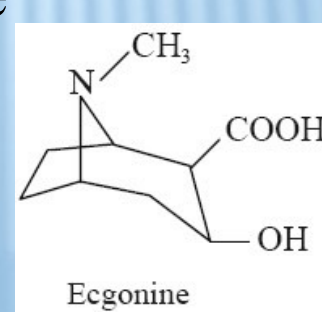
Most of the present-day supply of the drug is obtained from cultivated plants grown at an altitude of 500 to 2000 meters in Peru and Bolivia. Bolivia and Peru each produces about 50,000 metric tons of leaves a year. About 25% of the harvest is consumed by the indigenous population who chew the coca leaves. Approximately 2% is exported in legitimate commerce for the manufacture of pharmaceutical cocaine

#### *Act. const.*

Coca leaves contain 3 basic types of alkaloids: derivatives of ecgonine (cocaine, cinnamylcocaine, a- and p-truxilline), tropine (tropacocaine, valenne), and hygrine (hygroline, cuscohygrine). Only the ecgonine derivatives are commercially important. The composition of the alkaloid mixture in the leaf varies qualitatively and quantitatively according to the variety of the plant

#### **Test for cocaine**

**VitaliMorin reaction** (modified). Heating with potassium nitrate and sulphuric acid followed by extraction and acetone/sodium hydroxide solution results in a **purple colour**.



COCA LEAVES WERE HIGHLY VALUED BY THE NATIVES LONG BEFORE THE SPANISH CONQUEST; THE SHRUB WAS KNOWN AS "THE DIVINE PLANT OF THE INCAS." AN EXTENSIVE ARTICLE ABOUT THE DRUG WERE PUBLISHED IN 1569. THE NATIVES CHEW THE LEAF, EITHER AS SUCH OR MIXED WITH LIME AND ARE THUS ABLE TO TRAVEL GREAT DISTANCES WITHOUT EXPERIENCING FATIGUE. COCA WAS INTRODUCED INTO EUROPE ABOUT 1688 AND COCAINE WAS ISOLATED IN 1860.

### *Uses*

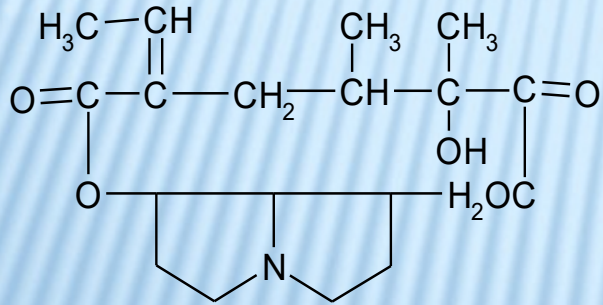
- ✘ Cocaine possesses the ability to block nerve conduction upon local application (a local anaesthetic action). Its systemic effect is stimulation of the central nervous system, but this action is not used for clinical purposes as the alkaloids are too toxic in its several other side actions.
- ✘ For local anaesthetic purposes , a number of synthetic drugs are now generally preferred.
- ✘ **It is a highly habit-forming drug.**



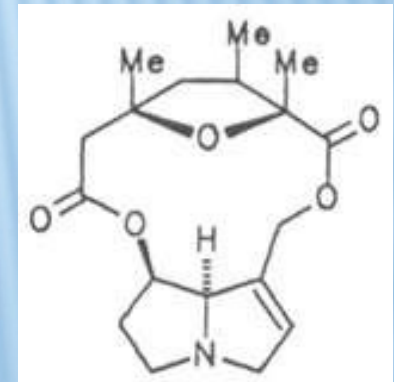
*Medicinal plant material containing  
**PYRROLIZIDINE ALKALOIDS** (ornitin  
derivatives)*

**HERBA SENECTIONIS PLATYPHYLLOIDES RHIZOMATA CUM  
RADICIBUS SENECTIONIS PLATYPHYLLOIDES  
SENECIO PLATYPHYLLOIDES  
ASTERACEAE**

THESE ALCALOIDS HAVE AT PRESENT NO GREAT MEDICINAL SIGNIFICANCE THEY ARE WELL KNOWN FOR THEIR TOXICITY TO LIVESTOCK. THEY ARE POISONOUS HEPATOTOXIC CONSTITUENTS OF PLANTS. SOME OF THIS ALCALOIDS ALSO SHOW CARCINOGENIC AND MUTAGENIC PROPERTIES. THEY OCCUR IN SMALL QUANTITIES IN SOME HERBAL PRODUCTS SUCH AS COMFREY (BORAGINACEAE) AND COLTSFOOT (ASTERACEAE).



Platyphylline



*Uses*

**Platyphylline hydrotartrate – spasmolytic**

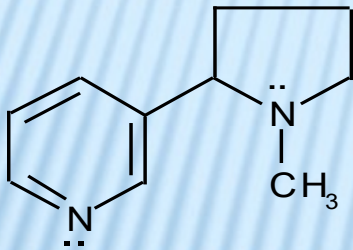


*Medicinal plant material containing  
PYRIDINE AND PIPERIDINE  
ALKALOIDS  
(lysine derivatives)*

**TOBACCO LEAVES - FOLIA NICOTIANAE**  
**TOBACCO - NICOTIANA TABACUM**  
**RUSTIC TOBACCO - NICOTIANA RUSTICA**  
**FAM. - SOLANACEAE**

*Act const*

↳ **alkaloids: nicotine (0,3-6%),**  
Tobacco smoke contains highly carcinogenic nitrosamines, which are formed from nicotine and its related alkaloids nornicotine and anabasine .



**Nicotine**

Nicotine has a unique action on the autonomic ganglia which it first stimulates and then depresses leading to paralysis.

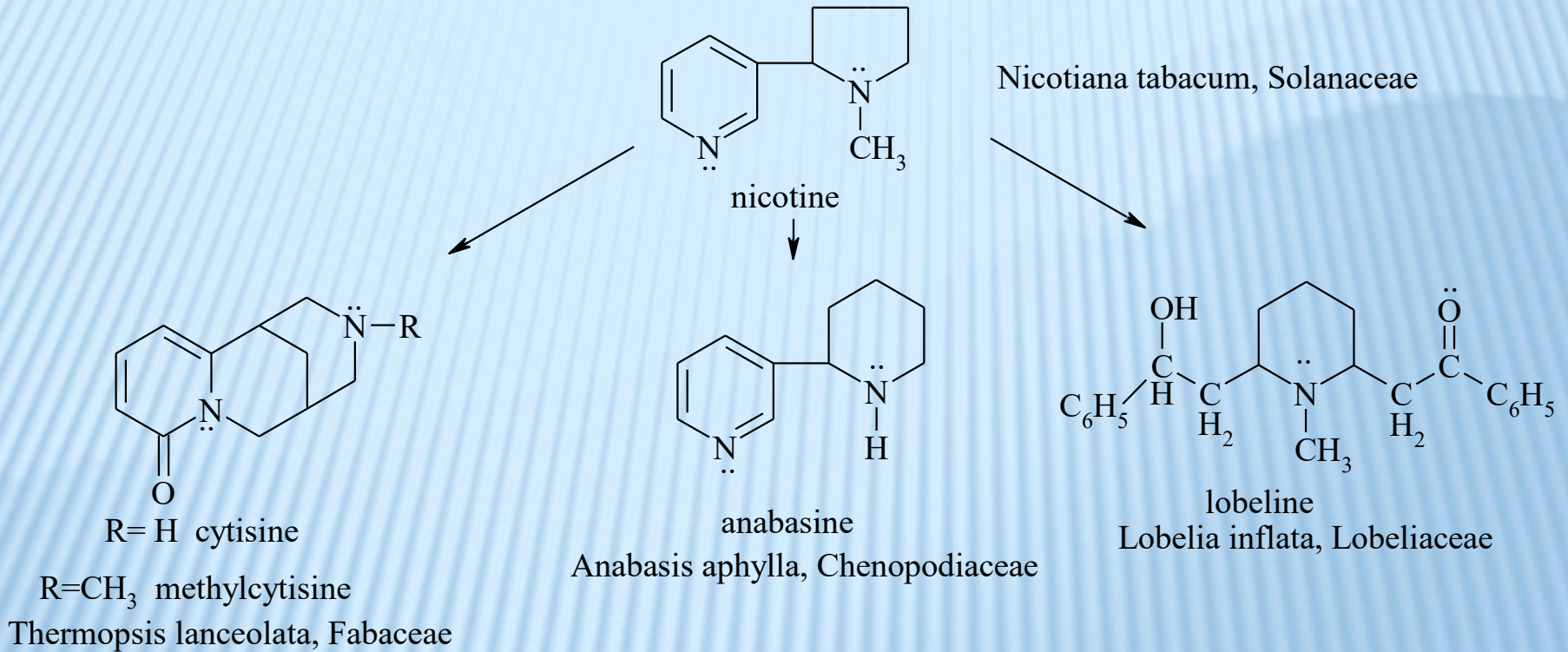
*Uses*

**As component of chewing gum to aid in breaking the tobacco habit;**  
**Because of the high toxicity of nicotine, it is of little use in medicine.**  
**Insecticide.**





## Aid in breaking the tobacco habit



## LOBELIA HERB - HERBA LOBELIAE

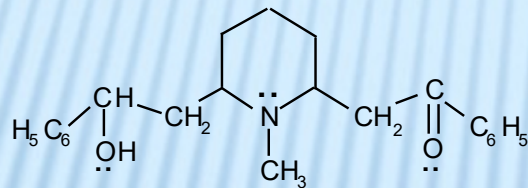
## LOBELIA OR INDIAN TOBACCO - LOBELIA INFLATA

### FAM. - LOBELIACEAE

The plant is indigenous to the eastern USA and Canada. It is cultivated in the USA

### Act.const

✦ alkaloids: lobeline, lobelidine, lobelanine.



**lobeline**

### Uses

Lobelia is used in spasmodic asthma and chronic bronchitis; as expectorant; **“Lobeline hydrochloride”** – analeptic; it is included in some antismoking preparations.

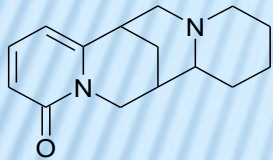




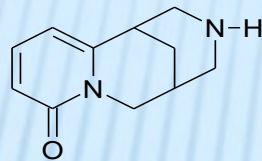
**BUSH PEA HERB - HERBA THERMOPSISIDIS LANCEOLATAE**  
**BUSH PEA SEEDS - SEMINA THERMOPSISIDIS**  
**BUSH PEA - THERMOPSIS LANCEOLATA**  
**FAM. - FABACEAE**

*Act. Const.*

↳ **Alkaloids 2,5%,**



Thermopsine



Cytisine



*Uses*

**Dry extract** (from herb) – expectorant.

**Cytitone 0,15% sol.** (from seeds) – breathing analeptic, it stimulate respiratory center;  
tablets *Tabex* - antismoking drug

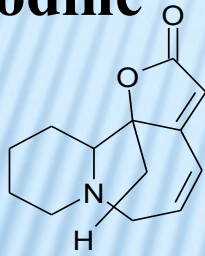
# HATCHET-VETCH STEM - *CORMUS SECURINEGAE*

## HATCHET-VETCH - *SECURINEGA SUFFRUTICOSA*

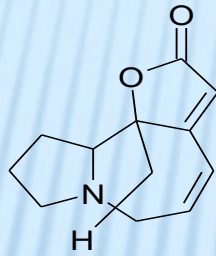
### FAM. - *EUPHORBIACEAE*

#### *Act.const*

⚡ Alkaloids: securinine  
0,3%, norsecurinine,  
suffruticodine



securinine



norsecurinine



#### *Uses*

**securinine nitrate** – Stimulates CNS, tonic in case of neurasthenia, impotency.

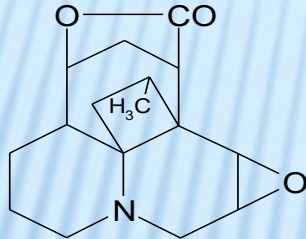
⊗ like strychnine !



**FOXFEET HERB- HERBA HUPERZIAE SELAGINIS**  
**FOXFEET - HUPERZIA SELAGO = LYCOPÓDIUM SELÁGO**  
**FAM. - LYCOPODIACEAE**

*Act. const*

- ↳ Alkaloids 0,4-1,1%,
- ↳ resins,
- ↳ flavonoids



**annotinine**



*Uses*

**Infuse** has emetic action. It is used in chronic alcoholism.



**PEPPER FRUIT - FRUCTUS PIPERIS NIGRI**

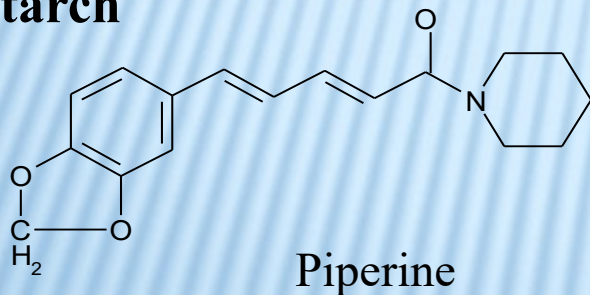
**WHITE PEPPER - FRUCTUS PIPERIS ALBI**

**BLACK PEPPER - PIPER NIGRUM**

**FAM. - PIPERACEAE**

*Act. Const.*

- ↳ alkaloids piperine and piperettine (5-9%),
- ↳ volatile oil (0,9-2,5%),
- ↳ resin ,
- ↳ fixed oil (6-12%),
- ↳ starch



*Uses*

**Treatment of chronic bronchitis, excitation of appetite and for improvement of digestion.**



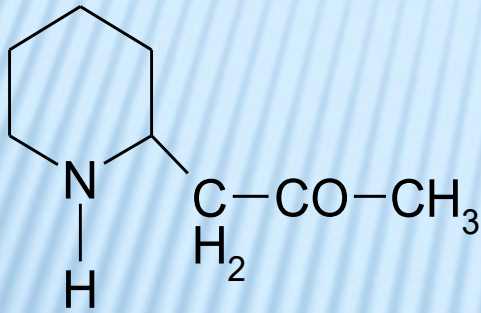
# POMEGRANATE BARK- CORTEX GRANATI RADICIS

## POMEGRANATE - PUNICA GRANATUM

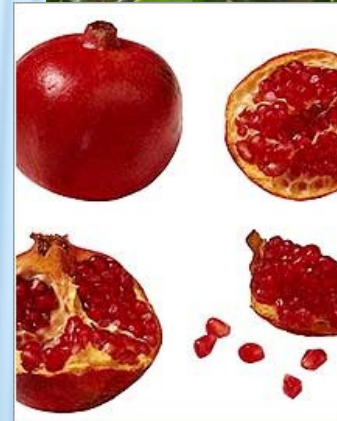
### FAM. - PUNICACEAE

#### *Act. Const.*

- ↳ Alkaloids 0,5-0,9% (pelletierine, isopelletierine)
- ↳ Tannins 22%



Isopelletierine



#### *Uses*

**Bark and «pelletierine»** – antihelminthic; **peel** (20-28% tannins) – to treat dysentery; **juice of fruit** – source of citric acid (up to 10%)