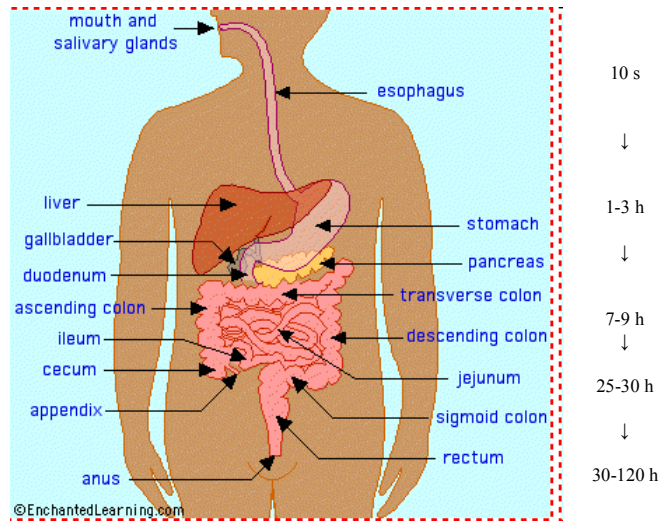


# GIT



## DRUGS USED FOR TREATMENT OF GIT DISORDERS

- Drugs of oral cavity and esophagus
- Drugs affectin digestive process
  1. Digestive (eupeptics)
  2. Stomachics, Amare
  3. Antacids, Antiulcerotics
  4. Cholagogic
- Drugs affecting motoric activity (Prokinetics)
  1. Laxatives
  2. Antidiarhoics
  3. Carminatives (deflatulents)
  4. Spasmolytics
- Drugs affecting nausea and vomiting
  1. Emetics
  2. Antiemetics

## DRUGS OF ORAL CAVITY AND ESOPHAGUS

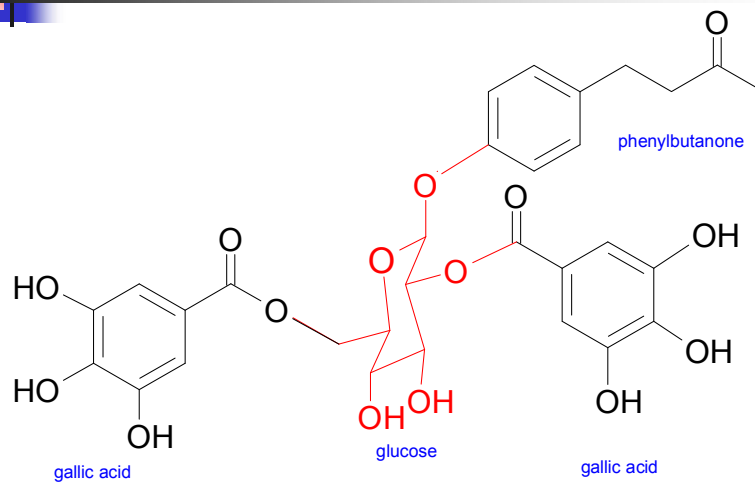
### ■ Antiphlogistics – antiseptics

- Chamomillae flos (essential oil, flavonoids)
- Salviae herba (essential oil, tannins, flavonoids)
- Gummiresina myrrha (essential oil, triterpenic acids)
- Rhei radix (lindleyin, isolindleyin)

### ■ Astringents – tannins

- Tormentillae radix
- Ratanhiae radix
- Galla
- Quercus cortex
- Tct. gingivalis

## LINDLEIYN





## DRUGS OF ORAL CAVITY AND ESOPHAGUS

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### ■ Protectives – mucilages

- Althaeae Radix et Folium
- Farfarae folium
- Plantaginis folium
- Lichen islandicus

### ■ Baktericids, virocidés

- Propolis (flavonoids, esters of caffeic acid and others) **!! Allergy!!**
- Lysosyme (basic polypeptid – hydrolase, stimulating antibacterial and antiphlogistic effect). Occurrence: tears, saliva, egg white – albumen, some plants)
- Antibiotics (Candidoses) - (Amphotericine B, Nystatine, Bacitracine, Gramicidine)



## DRUGS AFFECTING DIGESTIVE PROCESS

### DIGESTIVES (Eupeptics)

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- Dyspepsia – symptom accompanying disorders of digestive process (feelings of pressure and fullness, slow digestion, belch, loss of appetite, stomach „on water“, meteorism, flatulence, irregular defecation)
- D. organic (accompanies serious diseases)
- D. secondary (problems induced by diseases of other organs, or by using ATB)
- D. functional (individual disease, disorder of activity of GIT, especially stomach).
  - disorders or errors in regimen
  - negative psychosocial influences (stress, fears, anxiety, tension)
  - break of gastric juice secretion

DRUGS: missing enzymes (substitution therapy)

stomachics (increase excretion of gastric juice - spices)



## PEPSINI PULVIS – Pepsin powder (ČL 2005)

- Gastric proteinases active in acidic environment (pH 1 to 5).
- Preparations from gastric mucose of pigs, cows or sheep.
- Counted on dried substance, activity at least 0,5 Ph. Eur. u. in milligram.

### Manufacturing:

- Animals for obtaining must fulfill requirements of relevant authority on health of animals used for consumption by human.
- The manufacturing process must prove the rate of inactivation or possibility of decontamination (impurities, contamination by viruses or microbial infection).

Properties: White or yellowish, crystalline or amorphous hygroscopic powder. It is well soluble in water, practically insoluble in 96% ethanol. Water solution can show weak opalescence and weak acidic reaction.

Effect: catalyses hydrolysis of peptidic bonds formed by aminogroups of **tyrosine and phenylalanine (Phe-Leu, Phe-Phe, Phe-Tyr) to give rise to peptons** (mixture of peptides with MW 300-3000).

Usage: gastric indigestion accompanied by gastritis; cholecystopathy; hepatopathy; loss of appetite; disorders of digestion after GIT surgery



## PANCREATINI PULVIS – Pancreatin powder (ČL 2005)

- Preparation contains enzymes with proteolytic, lipolytic and amylolytic activity.
- It is prepared from fresh or frozen mammalian pancreas.
- 1 milligram of substance contains at least 1,0 Ph. Eur. U. of total proteolytic activity, 15 Ph. Eur. U. of lipolytic activity and 12 Ph. Eur. U. amylolytic activity.

Production: Prepared under conditions minimalizing the level of microbial contamination.

Properties: Bright brown amorphous powder. It is partially soluble in water, practically insoluble in 96% ethanol and diethylether.

Effect: Catalysis of fission reactions at pH 7,5-8,5 (only in from of enteric preparations)

Proteases hydrolyse peptids to aminoacids

Lipase hydrolyses triacylglycerols at position 1 and 3 forming 2-monoacylglycerol

Amylase is identical with alfa-amylase from saliva

Important are also present ribonucleases, deoxyribonucleases, cholesterolesterase, retinylesterhydrolase

Usage: excretoric insufficiency of pancreas (pancreatitis); hepatopathy, cholecystopathy; inhibition of digestive enzymes during ATB therapy; dispepsy of unknown ethiology.

Preparations: Kreon; Pancrease; Pangrol; Panpur; Panzynorm; Panzytrat; Prolipase; Combizym; Digestif Rennie; Pancreon compositum; Wobenzym



## TRYPSINUM – Trypsine (ČL 2005)

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- Proteolytic enzyme obtained by activation of trypsinogen extracted from mammalian pancreas of healthy organisms.
- Activity at least 0,5 microcatal in milligram, expressed for dried material. Highest activity of solution at pH 8; activity is reversibly inhibited at pH 3, at which is the enzyme most stable.

Production: Animals for obtaining of trypsin must fulfill requirements of responsible authority on health of animals determined for consumption by human. It must be proved in which range the manufacturing process allows the inactivation or removal of any contamination by viruses or other agents causing infection.

Properties: White or almost white crystalline or amorphous powder, mildly soluble in water, amorphous form is hygroscopic.

Effect: Cleavages lysyl and arginyl bonds of peptides

Usage: part of pancreatine in combined preparations

Fibrinolytic in local application (cleavage not only nutritional peptides)

Preparations: Mulsal N; Wobe-Mugos; Phlogenzym; Wobenzym; Trypsin Retard; Chypsin



## CHYMOTRYPSINUM - Chymotrypsine

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- Proteolytic enzyme, does not affect healthy tissue
- Peptide obtained from zymogen by activity of chymotrypsinogen A

Production: Acidic extraction of pancreas and fraction crystallization yields chymotrypsinogen, which is activated by trypsin, dialyzed, sterilized and lyophilized

Properties: weakly yellowish hygroscopic powder, stable under acidic conditions (pH 4)

Effect: Preferential cleavage of carboxyl group bonds of Phe, Tyr, Trp and ester bonds. Possibility to cause milk coagulation. Cleavage of necrotic tissue, pus and fibrin

Usage: Internally combined preparations with pancreatine

externally fibrinolytic – acute purulent processes; necrotic wounds; lower leg ulcers, venous and trophic ulcers, gangrenes

Ophthalmology – zonulolysis during intracapsular extraction of lens

Preparations: Wobe-Mugos; Wobenzym; Chymotrypsin Infusia; Chypsin  
Zolyse a.u. opht.



## TAKA-AMYLASE – TAKADIASTASE

- Bacterial  $\alpha$ -amylase
- Protein single chain, contains Ca ions; *N*-terminal Ala, *C*-terminal Ser;

Preparation: Isolation from *Aspergillus oryzae*, crystallization

Properties: yellowish hygroscopic powder

Effect: facilitates digestion of starches, effective also under acidic condition (contrary to pancreatic amylase)

Usage: dyspeptic syndrome, during disorder of starch digestion, legumes, fruit and vegetables; limitation of meteorism before and after surgery

Preparation: Orenzym, Nortase



## PAPAIN – PAPAYOTIN

*Carica papaja* L., papaya (Caricaceae)

A shrub cultivated in tropic areas of South America, fruits very popular

Preparation: from milky latex of unripe fruits

Properties: Protein of single chain, contains thiol groups

Effect: Cleavage prevalently of peptides with basic building blocks basic aminoacids, mainly leucin and glycin. Optimal pH ~7. Activators are reduction agents.

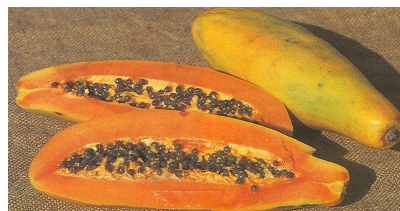
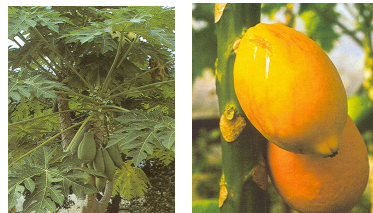
Usage:

- Per oral substitution therapy
- Liquefaction of oral and gastric mucosa
- Anthelmintic of endoparasites
- Food industry of South America

The same usage:

BROMELIN (*Ananas comosus* – ananas (Bromeliaceae))

FICIN (*Ficus* spp. L. – fig tree (Moraceae))



## CAPSICI FRUCTUS – pepper fruits

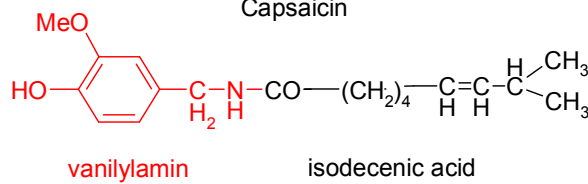
*Capsicum annuum* L., pepper (Solanaceae)  
*C. frutescens*, *C. chinense*

- Annual herb native to Central and South America
  - *C. frutescens*, *C. chinense* can be perennial
  - Lots of hybrides
- Drug – dried berries
- Capsaicin is localized mainly in placentas and seeds
- Carotenoids: capsanthine, capsorubin and others
- Ascorbic acid, essential oils
- Internal stomachic
- External rubefacient
- Spices, vegetables
- Industry

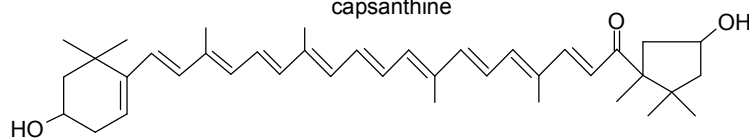


## Capsici fructus – content compounds

Capsaicin



capsanthine



## PIPERIS NIGRI FRUCTUS – Black pepper fruit

*Piper nigrum* L., black pepper (Piperaceae)

- Perennial climbing woody vine, cultivated in many tropical areas
- Cultivated similarly to hop on sticks and wires
- Infructescence is cut, when lower fruits starts to getting to be red
- Drug is berry-like fruit harvested before ripening

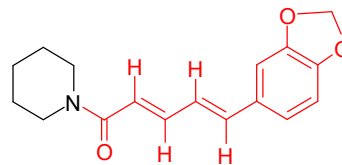
Characteristic: Sharp pungent taste, aromatic, aromatic odour

- Internally stomachic, carminative
- Externally rubefacient (chavicin)
- Spice



## *Piperis nigri fructus* – content compounds

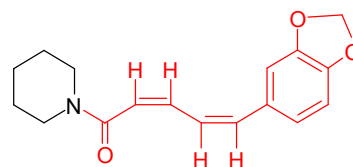
- Piperin and chavicin are unsymmetrically substituted dienes
- Biogenetically derived from lysin
- Essential oil: pinenes, phellandrene, piperonal, caryophyllene



Piperin (trans-trans)

### *Piperis albi fructus*

- Fruits of the same plant
- After harvesting macerated in water
- External layers of pericarp removed
- More smooth culinary use



Chavicin (cis-cis)



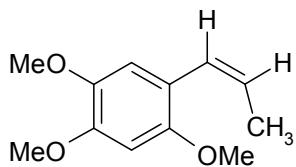
## CALAMI RHIZOMA – Sweet flag rhisome

*Acorus calamus* L., sweet flag or calamus (Araceae)

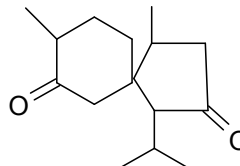
- Perennial herb of the banks of watercourses and swampy places
- Types – diploid, triploid and tetraploid, differ in composition and amount of essential oil
- In central Europe common triploid sterile type, propagation vegetative
- Drug: in autumn harvested rhizome dried by temperature up to 35 °C
- Content compounds: essential oil (2-4 %), bitter substances, tannins
- Internally: stomachic, aromatic amare
- Liquors manufacturing. Essential oil in perfumeries.



## Calami aromatici radix – content compounds



β-Asaron (sedative, hypnotic)



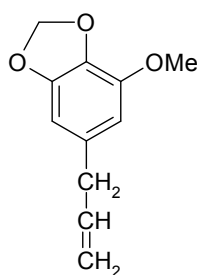
Acoron (bitter substance)

## MYRISTICAE SEMEN – nutmeg seed *Myristica fragrans*, nutmeg (Myristicaceae)

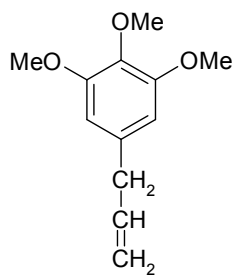
- Evergreen, permanently flowering trees cultivated in tropic areas, harvest 3x/year
- *Arillus myristicae*, Macis – nutmeg flower
- Seeds are dried and testa is removed
- Drug is composed by perisperm, endosperm and sprout (calcified)
- Content compounds: 25-40 % of fatty oil (*Oleum nucistae*), 8-15 % of essential oil, hydrodistillation produces *Myristicae etheroleum*, proteins, starch, pigments, phytosterols
- Usage: aromatic stomachic
- Misuse – hallucinogenic



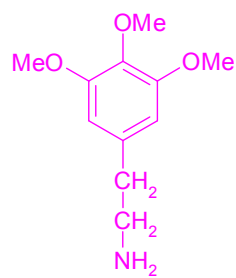
## Myristicae semen – content compounds



Myristicine



Elemicine



Mezkaline (Anhalonium)

## Zingiberis rhizoma – ginger rhizome (ČL 2005) Zingiber officinale, ginger (Zingiberaceae)

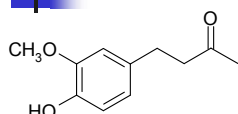
- Perennial herb cultivated only, tropic areas
- Sterile, propagation vegetative only (similar to potatoes cultivation)
- Drug: dried rhizome, removed cork
- Contains at least 15 ml of essential oil / kg of dried drug
- Content compounds:
  - Essential oil: sesquiterpenes bisabolene, zingiberene, zingiberol
  - Non-volatile phenolic ketones: zingerone, gingerol, shogaol
  - Starch

### Usage:

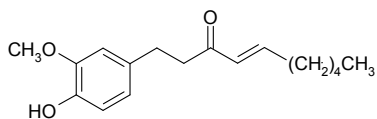
- Stomachic aromatic, choleric, antiemetic
- Curry spices
- Production of ginger beer, lemonades and appetitives



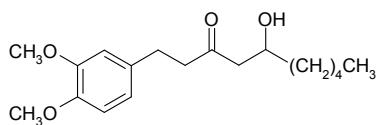
## Zingiberis rhizoma – content compounds



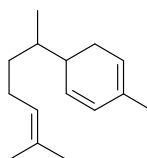
zingerone



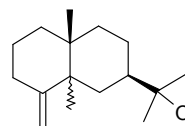
shogaol



methylgingerol



Zingiberene



Zingiberol

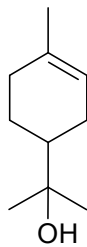
## Cardamomi fructus – Cardamom fruit

*Elettaria cardamomum*, green cardamom, true cardamom  
(Zingiberaceae)

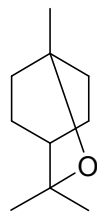
- Perennial herb, India, Sri Lanka, Guatemala
- Fruit – three-capsuled ball, in capsule 5 seeds
- Fruits are after drying process bleached by sulphurous oxide
- Pharmacopoeias of Asian countries demand small, so called malabar cardamoms, not ceylon cardamom
- Content compounds:
  - essential oil
  - proteins, oil
- Usage:
  - Aromatic carminative
  - Curry spices
  - Liquors manufacturing



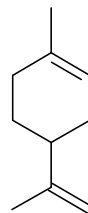
## Cardamomi fructus – content compounds



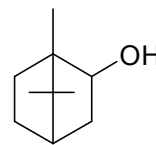
alfa-terpineol



1,8-cineol



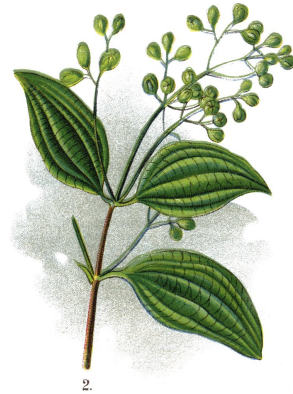
limonene



borneol

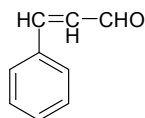
## Cinnamomi cortex – Cinnamom bark ČL 2005 Cinnamomum zeylanicum, cinnamon tree (Lauraceae)

- Trees cultivated in form of shrubs
- Cultivated at Ceylon, in south India, at Jamaica, in Brazil
- Drug: Dried bark without external cork layer and parenchyma – peeled bark
- Content compounds:
  - Essential oil (12 ml/1 kg of drug)
  - Tannins, starch, mucilage, mannitol
- Usage:
  - Stomachic
  - Coregent of taste and odor
  - Spice

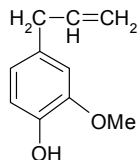


## Cinnamomi zeylanici corticis etheroleum – Essential oil of cinnamon bark ČL 2005

- Essential oil obtained by steam distillation of young branches
- Bright yellow, while aging reddish liquid
- Pinene, phellandrene, caryophyllene, esters, ketons



Cinnamoyl aldehyd (60-75 %)



Eugenol (4-10 %)



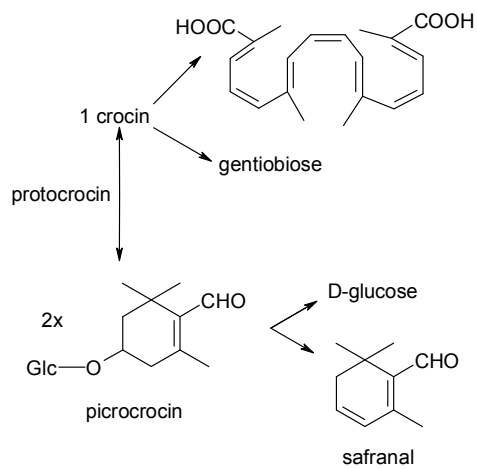
## Crocus – Saffron

*Crocus sativus*, saffron (Iridaceae)

- Perennial herb cultivated in Spain, France, Iran, Balkan Peninsula
- Drug: „Stigmata croci“ stigmas obtained from opened flowers in the morning, dried over the hot charcoal
- Content compounds: crocin, picrocrocin, safranal, carotene, lycopene, zeaxanthin
- Stomachic, coregent of taste and odor
- Spice



## Saffron – content compounds



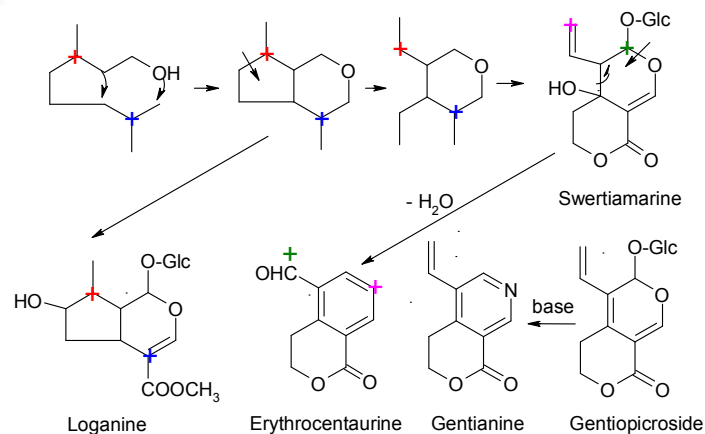


## AMARA – BITTER SUBSTANCES

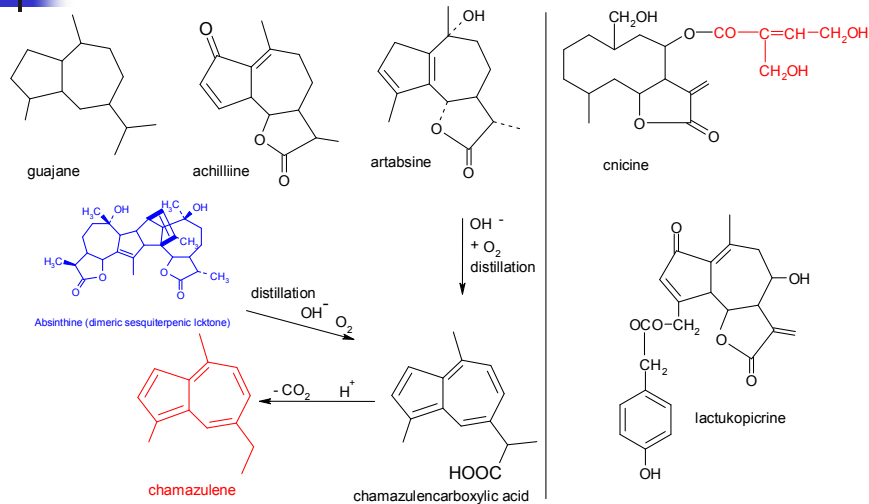
- Drugs containing bitter substances without other important or marked pharmacological effects
- Structurally not uniform, mostly belong to terpenoids
- Formal division:
  - bitter substances of Gentianaceae family (modifications of panel of monoterpenes)
  - bitter substances of Asteraceae (sesquiterpenic lactones)
- Proof and quantification according to the pharmacopoeia by biological assay – number of bitterness
- Bitter substances are used as decoctions, tinctures, extracts and medicinal wines. They are not used as isolated pure substances.
- Administered before eating they increase the secretion of gastric juices and increase the gastric acidity
- Large consumption in food industry – bitter beverages, aperitifs



## Bitter substances of Gentianaceae



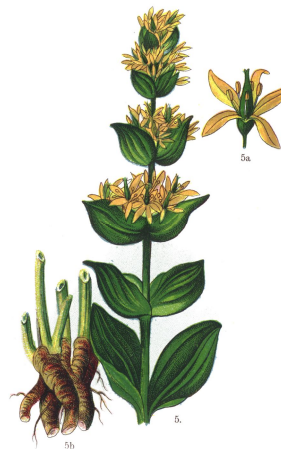
## Bitter substances of Asteraceae



## Gentianae radix – Gentian radix ČL 2005

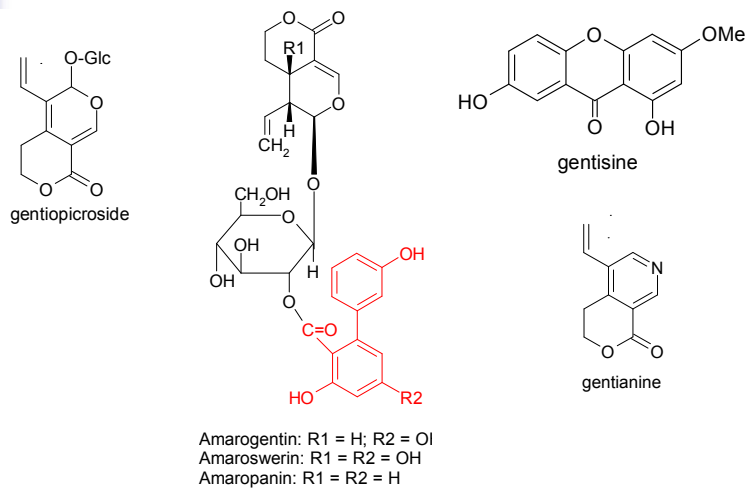
*Gentiana lutea* – great yellow gentian, *G. pannonica*, *G. punctata*,  
*G. purpurea* (Gentianaceae)

- Perennial plants native to mountain meadows
- Main suppliers: France, Spain
- Drug: non-fermented, rapidly dried roots
- Content compounds:
  - glycosidic bitter substances: gentiopicrosid and amarogentine
  - yellow derivative of xanthone: gentisine
  - tannins, mucilages, pectins
  - no starch, present is trisaccharide: gentianose





## Gentianae radix – content compounds



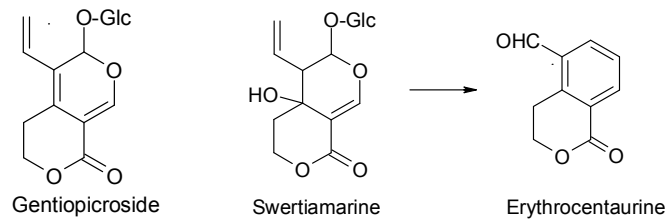
## Centaurii herba – Centaury herba ČL 2005

*Centaurium minus, C. erythrea* - centaury (Gentianaceae)

- Annual or biennial herb (Europe, Asia, America)
- Drug: dried haulm, harvested in VII-VIII
- Content compounds:
  - bitter substances gentiopicroside, erythrocentaurine, swertiamarine
  - flavonoids
- Bitter substances present in stalks, in leaves in minimal concentration
- Usage: amare, digestive, stomachic
- Dosage: 0,5 g in 200 ml of maceration



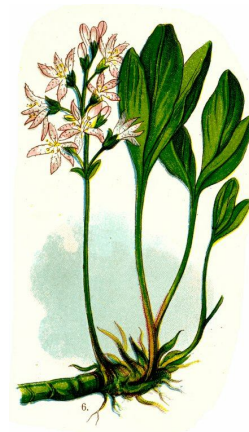
## Centaurii herba – content compounds



## Trifolii fibrini folium – Bog-bean leaves ČL 2005

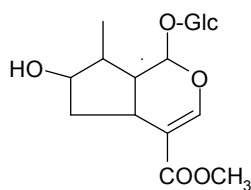
*Menyanthes trifoliata*, bog-bean or buckbean (Menyanthaceae)

- Perennial mud herb (Europe, middle Asia, North America)
- Drug: dried trifoliate, long petiolated leaves harvested in V-VI
- Content compounds:
  - bitter substances loganine, sweroside, swertiamarine, menyanthin
  - tannins, pectin
- Usage: amare, digestive, stomachic, cholagogue
- Dosage: 0,5 g in 200 ml of maceration
- Usage in liquors manufacturing



## Trifolii fibrini herba – content compounds

- Loganine
- Sweroside, swertiamarine (originally in *Swertia* spp., used as amare in Japan)



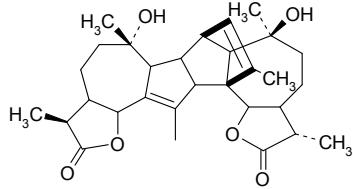
Loganine

## *Absinthii herba* – wormwood aerial part ČL 2005 *Artemisia absinthium*, common wormwood (Asteraceae)

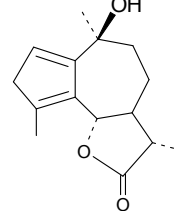
- Perennial herb of Europe, Asia, Africa
- Widely grows on infertile stony hillsides
- Chemical varieties (differ in content compounds)
- For pharmaceutical purposes it is cultivated.
- Harvested herb in VII-VIII
- Do not substitute with *Artemisia vulgaris*!
- Content compounds:
  - Essential oil:
    - sesquiterpenoid guaianolides
    - thujone, thujylalcohol
    - phellandrene, cadinene
  - Tannins
- Aromatic digestive, choleric, spasmolytic



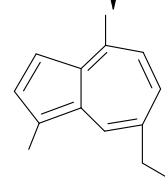
## Absinthii herba – content compounds



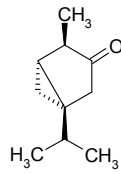
Absinthine (dimeric sesquiterpenic lactone)



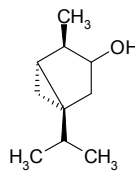
Artabsin



Chamazulene



Thujone

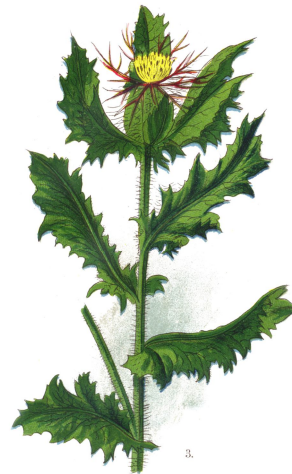


Thujol

## Cardui benedicti herba – cnicus aerial part

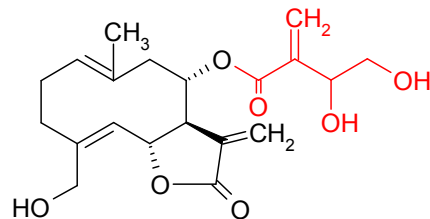
*Cnicus benedictus* (*Centaurea benedicta*) - St. Benedict's thistle  
(Asteraceae)

- Annual herb native to Mediterranean, today cultivated
- Drug: dried haulm harvested before flowering period
- Content compounds:
  - bitter substance: cnicin
  - essential oil, mucilage
- Stomachic, amare, liquors manufacturing



## Cardui benedicti herba – content compounds

3,4-dihydroxy-2-methylenbutanoic acid



Cnicin  
germacranolide, lactone sesquiterpene

## Millefolii herba – common yarrow aerial part ČL 2005

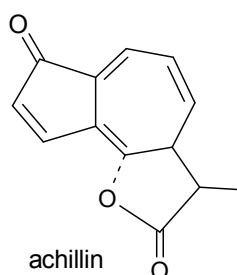
*Achillea millefolium*, common yarrow (Asteraceae)

- Perennial herb common in Europe, North Asia and North America
- Presence lots of chemical varieties, different in presence of proazulenic compounds
- Drug: dried herb harvested during flowering period
- Content compounds:
  - bitter substance achillin (proazulene)
  - essential oil (up to 40 % of chamazulene)
  - caryophyllene, borneol, cineol
  - flavonoids, tannins, coumarins
- Usage: stomachic, amare, carminative
- External usage of decoction - antiphlogistic



## Millefolii herba – common yarrow aerial part ČL 2005

*Achillea millefolium*, common yarrow (Asteraceae)



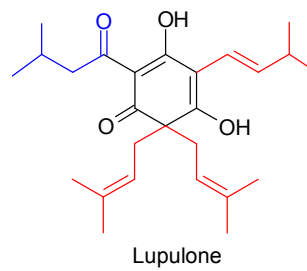
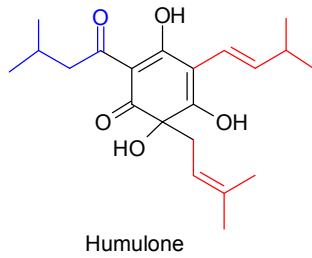
## Lupuli flos – hops ČL 2005

*Humulus lupulus*, hop (Cannabaceae)

- Perennial dioecious climbing plant
- Only female plants cultured
  - Vegetative propagation
- Drug: dried hops
  - Bracts covered with orange-colored glandules
- Content compounds:
  - resin composed from hop bitter acids (derivatives of prenylated monoacylphloroglucinol)
  - essential oil (humulene, pharnesene, myrcene, caryophyllene, spiroketals)
- Usage – see sedatives



## Lupuli flos – content compounds

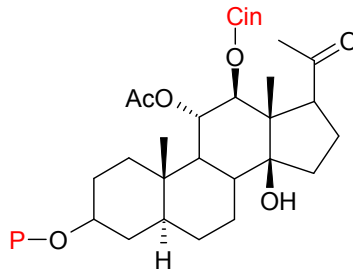


## Condurango cortex – Condurango bark *Marsdenia condurango* (Asclepiadaceae)

- Climbing vine native to South America (Ecuador, Peru, Colombia)
- Cultivated in east Africa
- Drug: dried brown-gray bark
- Content compounds:
  - bitter substance condurangine (pregnane glycoside esterified by cinnamic acid and acetic acid). At 40 °C forms gel, therefore macerations must be cold-filtered
  - essential oil
  - derivatives of triterpene amyryne
  - cyclitol conduritol
- Usage: amare



## Condurango cortex – content compounds



Condurangoglycoside A1

Cin = cinnamoyl, P = pentasaccharide

(D-glc-D-glc-[3-OMe-deoxy-D-allose]-D-ole-D-cym)

steroid of pregnane type

## Herbal bitters – Becherovka

Mixture A	Volume
▪ Absynthii herba	1
▪ Centaurii herba	2
▪ Menthae herba	4
▪ Melissa herba	4
▪ Calami radix	2
▪ Angelicae radix	4
▪ 300 ml of mixture A into 5 l of EtOH 80%	
add:	
▪ Carvi fructus	2 tea spoons
▪ Anisi fructus	2 tea spoons
▪ Caryophylli flos	2 tea spoons
▪ Cinnamomi cortex	10 cm
▪ Vanillae fructus	5 pods

Macerate for 4 weeks, decant into 10 l bottle.

Drugs after decantation + 4 l of water, macerate 2 weeks. Then add to EtOH solution.

Separately dissolve 1,3 kg of sugar in 1 l of water and after cooling add.

2 weeks fine down, filter and use *ad usum proprium*.





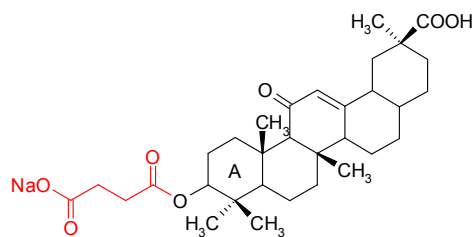
## ANTACIDS, ANTIULCEROTICS

Factors: stress, hyperacidity, pyrosis, bad life style,  
*Campylobacter pylori*

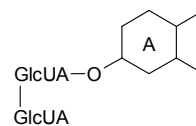
- Diet, improvement of life style
- Antacids (compounds of Mg, Al, Bi, alkaline CO<sub>3</sub>)
- Parasympatolytics (tropane alkaloids)
- Mucoprotectives (mucilages, pectin, alginic acids)
- Cytoprotectives (carbenoxolon – BIOGASTRONE)  
(glycyrrhizinic acid – k. glycyrrhetic acid – + 3-OH-succinic acid)  
mineralokortikoid effect (hypocalemia, retention of sodium and water, increase of blood pressure, edemas formation)
- Prostaglandins



## Carbenoxolon



Carbenoxolon (BIOGASTRONE)



Glycyrrhizin



## Antacids – mixed preparations

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### **VICALIN, ROTER tbl.**

- *Frangulae cortex*
- *Calami radix*
- Rutoside
- Khellin
- Basic bismuth carbonate
- Magnesium carbonate
- Natrium hydrogencarbonate

### **CAVED-S**

- *Frangulae cortex*
- *Calami radix*
- *Liquiritiae succus deglycyrrhizinatus*
- *Foeniculi fructus*
- Aluminium hydroxide colloidal
- Basic bismuth carbonate
- Magnesium carbonate
- Natrium hydrogencarbonate



## CHOLAGOGUES

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Preparations affecting bile production and gallbladder kinetics

- Cholagogues – support formation and excretion of bile
- Cholekinetics – support gallbladder evacuation
- Substitutive therapy with bile acids

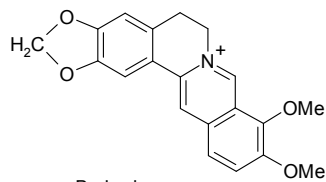
**Berberidis radialis cortex – Root bark of barberry**  
*Berberis vulgaris* - European barberry, Jaundice berry, Ambarbaris,

**Barberry (Berberidaceae)**

- Shrub widely spread in Europe, shrubberies, hedgerows, soil rich in calcium
- **Drug:** root bark harvested in autumn
- **Content compounds:**  
 - alkaloids of isoquinoline type (berberin, oxyacanthin, berbamin, columbamin, palmatin)
- **Usage:** choleric, liver diseases, icterus, cholelithiasis
- Reportedly preparation for removal of morphine addiction
- *Fructus berberidis* – fruits of barberry vitaminiferum

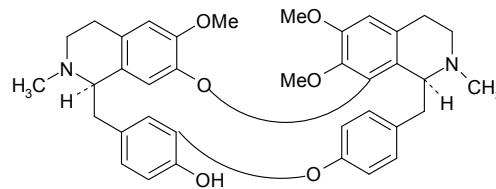


**Berberidis radialis cortex – content compounds**



Berberin

Yellow colored alkaloid (choleric, antiphlogistic, antiamoebic, bacteriostatic)  
 In Japan from *Coptis japonica*



Oxyacanthin

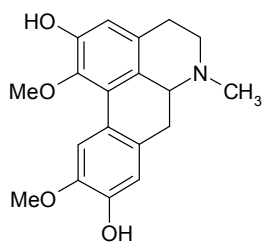
## Boldo folium – Boldo leaves ČL 2005

*Peumus boldus*, boldo (Monimiaceae)

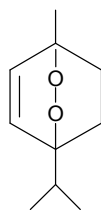
- Dioecious evergreen tree (Chile, Peru)
- **Drug:** oval integerrimus leaves with thickened gray-green underwinded blade
- Content compounds:
  - essential oil (20-40 ml / 1 kg uncut drug)
  - aporphine alkaloids 0,1 % – boldine
  - flavonoid glycosides
- Usage:
  - choleric (cholecystopathy)
  - boldine relaxes smooth muscles and possesses hepatoprotective effect
- *Boldo etheroleum* – for ascaridol content as anthelmintic



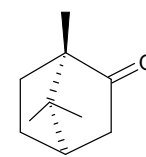
## Boldo folium – content compounds



Boldine

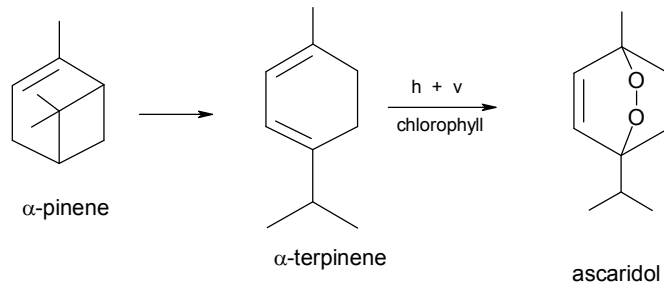


Ascaridol



(+)-camphor

## Boldo folium – formation of ascaridol



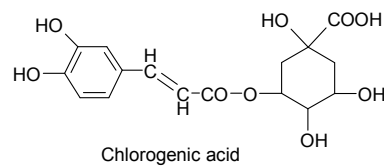
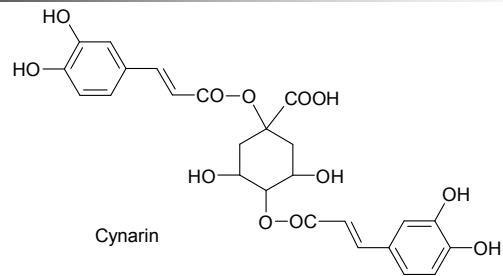
## Cynarae radix, folium – Artichoke leaf and root *Cynara scolymus*, artichoke (Asteraceae)

- Perennial herb with beet-shaped thickened root
- Mediterranean, France, Spain
- Content compounds:
  - cynarin, chlorogenic acid, caffeic acid
- Usage: choloretic





## Cynarae radix, folium – content compounds



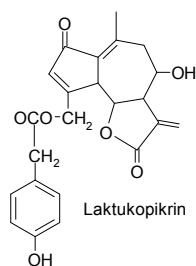
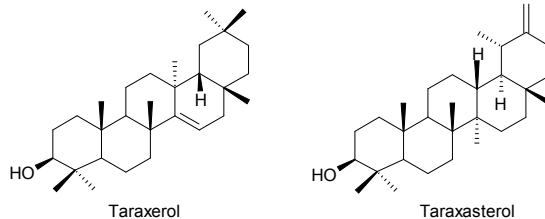
## Taraxaci radix cum herba – Common dandelion root with haulm

*Taraxacum officinale*, common dandelion (Asteraceae)

- Perennial weed herb
- Drug: roots with aerial part (leaves and backward flower heads)
- Content compounds:
  - taraxacin, lactukopicrin (bitter substances)
  - Taraxasterol, taraxerol (triterpenes)
  - Phytosterols
  - Vitamin C in leaves
- Usage:
  - cholagogue amare
  - diabetics use it for inuline content – coffee supplement



## Taraxaci radix cum herba – content compounds



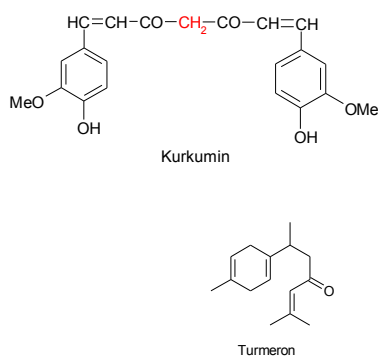
## Curcumae xanthorrhizae rhizoma – Oddenek kurkumy žlutokořenné ČL 2005

Curcuma xanthorrhiza, kurkuma žlutokořenná (Zingiberaceae)

- Vyrvalá bylina, pěstovaná v Indii a na Jávě
- **Droga:** Usušené oddenky zbavené silné vrstvy krycího pletiva spařením vodou, nakrájené na plátky
- **Obsahové látky:**
  - silice (50 ml v 1 kg)
  - dicinnamoylmethanové deriváty vyjádřené jako kurkumin (min. 1 %)
- **Použití:**
  - Choleretikum, cholekinetikum s antibakteriálními účinky
  - koření, barvivo



## Curcumae xanthorrhizae rhizoma – obsahové látky



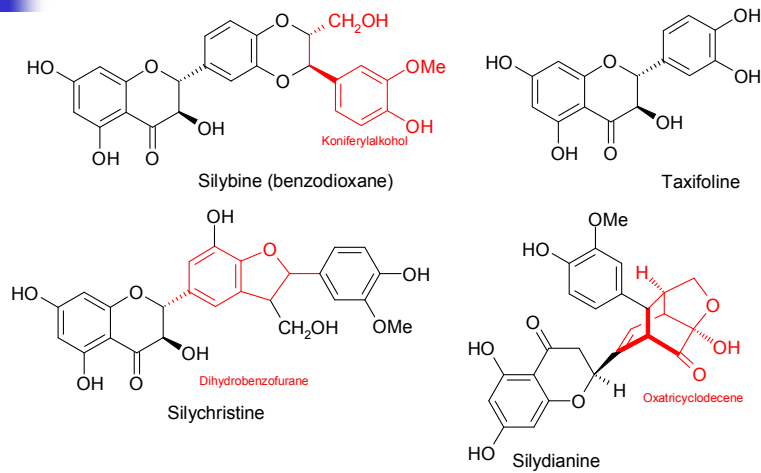
## Silybi mariani fructus – Plod ostropestřece mariánského *Silybum marianum* - blessed milk thistle, Marian Thistle, Mary Thistle, Saint Mary's Thistle, Mediterranean Milk Thistle, Variegated Thistle and Scotch Thistle (Asteraceae)

- Annual or biennial herb of south Europe
- Fruits (achenes) bear white *pappus*
- **Drug:** dried fruit with removed flues
- Content compounds:
  - flavonolignans 1,5-3 % (silybine, silychristine, silydianine)
  - flavonoids (taxifolin, chrysoeriol, quercetin)
  - lipids, proteins, sugars
- Usage:
  - choleric
  - hepatoprotective (inhibition of lipoperoxidation of membrane lipids)
  - stimulation of RNA-polymerase (regeneration)





## Silybi mariani fructus – obsahové látky



## Fel tauri – beef bile

- Excretion of bovine liver collected in gallebladder  
Removal of mucilage-like compounds, bile pigments (products of haemoglobine degradation), residue is thickened and dried
- Content compounds:
  - bile acids (cholate, desoxycholate, lithocholate, dehydrocholate) binded to glycin or taurin
  - cholesterol
- Natrium choleinicum is mixture of natrium salts of these acids
- Cholagogue – improving of the fat digestion

## Bile acids

