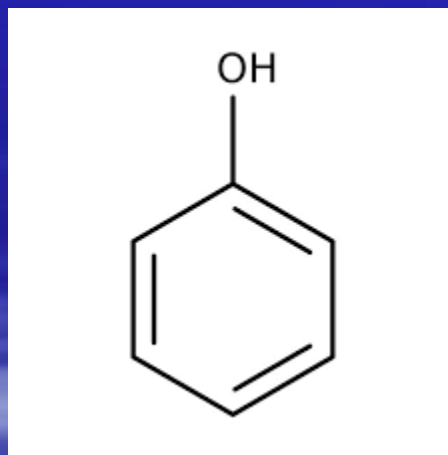


PHARMACOGNOSY-II

Assoc. Prof. Dr. Sinem ASLAN ERDEM

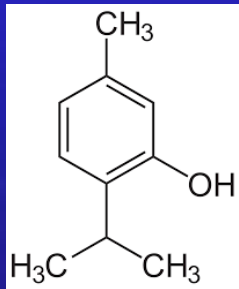
PHENOL GLYCOSIDES

- Any compound with a hydroxyl group linked directly to a benzene ring is called PHENOL.

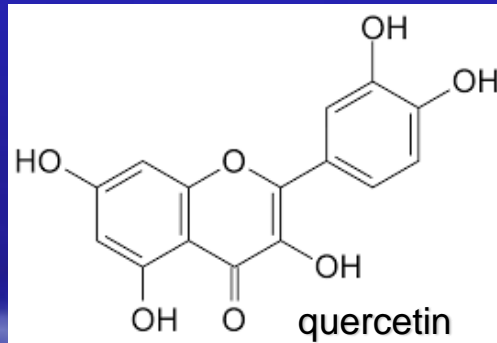


PHENOL GLYCOSIDES

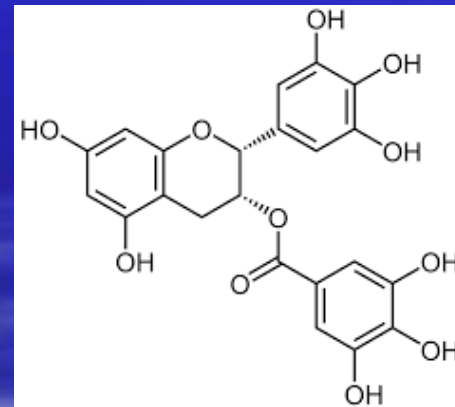
- Some phenolic groups are found in the plants in the non-glycosidic (free) form; e.g. thymol, carvacrol, eugenol...



thymol



quercetin

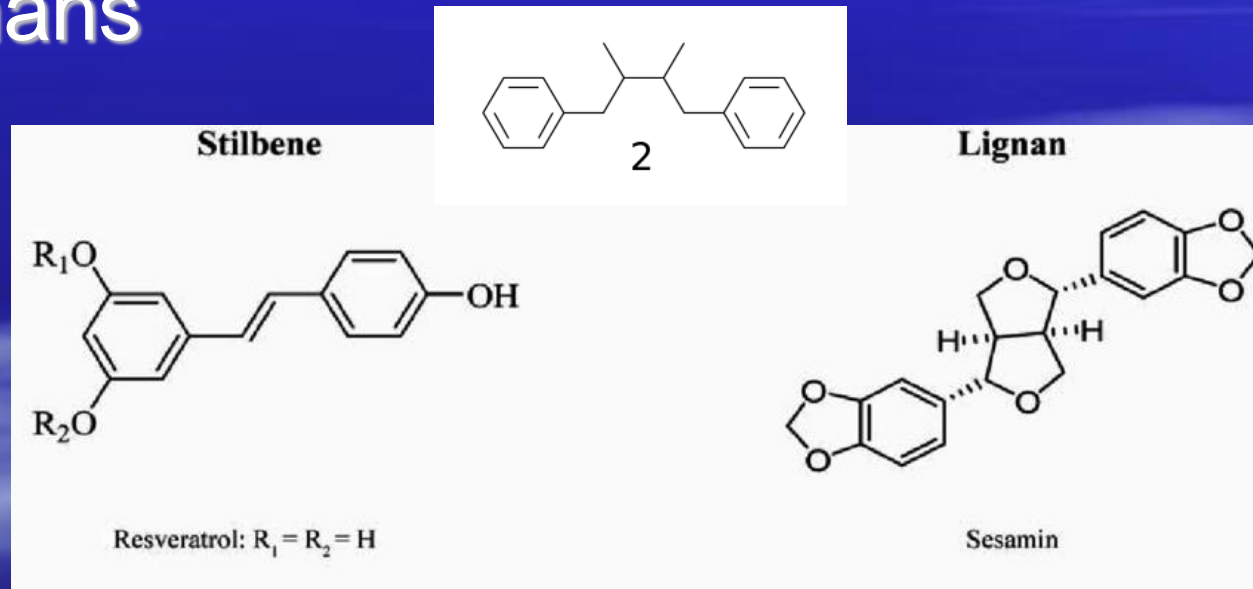


Epigallocatechin gallate (EGCG)

- There are those consist of two phenol such as Flavonoids; or three phenols such as tannins

PHENOL GLYCOSIDES

- There are dimerization derivatives of phenols in phenyl propanoid structure; e.g. lignans



PHENOL GLYCOSIDES

- ❑ Glycosidic bond between phenolic –OH and sugar is called PHENOL GLYCOSIDE

Identification and Properties

- They are less soluble in water, polyphenols are slightly more soluble
- They are soluble in alcohol and ether
- Most of them are volatile → can be distilled
- They have weak acidic property
- Alkaline phenolates are formed with alkaline hydroxides (They dissolve in alkaline hydroxides)
→ this feature distinguishes phenols from alcohols

PHENOL GLYCOSIDES

- Unlike acids, they don't dissolve in alkaline carbonates.
- ❖ Identification with colour reactions:
- ❖ Free phenols + aqueous ferric chloride (FeCl_3) → neutral medium → blue/green/purple/red colour (But also hydroxypyridine, some organic acids, enols, oximes may give positive reaction)

PHENOL GLYCOSIDES

- Phenols + amines dinitrosed by nitrous acid (e.g. P-nitraniline) → coloured hydrasoic acid derivatives occur.
- Phenols + aldehydes (e.g. Vaniline-HCl) and 2,6-dibromquinone chlorimide in acidic medium → give colour reactions.
- Phenols + acetic acid and benzoic acid → characteristic esters and meyhyl derivatives occur.
- Identification is also available by chromatographic techniques.

PHENOL GLYCOSIDES

QUANTIFICATION

- 1) **Colorimetric:** By using colouring reactions.
- 2) **Chromatographic:** Measured upon phenolic aglycones.
- 3) **Titrimetrically:** Can be applied after extraction with alkaline hydroxides.
- 4) **Gravimetrically:** After phenolics precipitated by aqueous Br₂, is weighed out and the amount is calculated.

PHENOL GLYCOSIDES

USES

- 1) Some of them are antiseptic
- 2) Antipyretic and analgesic
- 3) Some phenolic aglycones are odorous; used as aromatizer or odour improver in pharmaceutical and food industries.

CORTEX SALICIS, Söğüt kabuğu (White Willow Bark)

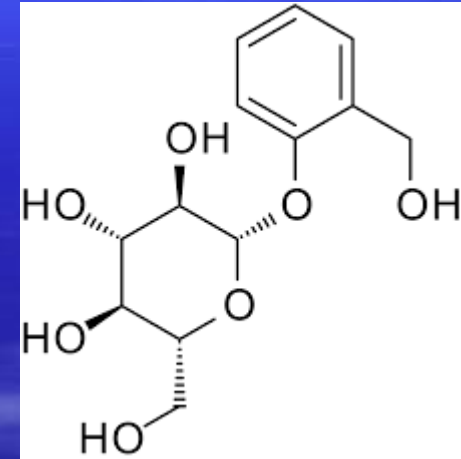
- The bark of the branches of *Salix alba* (Salicaceae) (Ak söğüt).
- Grows in damp, temperate and cold regions
- Widespread in Turkey
- Shedding leaves in winter, generally grows near a water source

CORTEX SALICIS, Söğüt kabuğu (White Willow Bark)

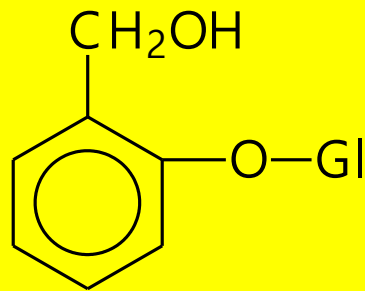
- Approximately, there are 25 *Salix* species growing in Turkey
Among these species the most common ones are:
- *S. alba* (ak söğüt – white willow)
- *S. babylonica* (salkım söğüt - Babylon willow or weeping willow)
- *S. caprea* (keçi söğütü – goat willow)
S. cinerea (boz söğüt – grey willow)
- *S. excelsa* (yüksek söğüt -)
- *S. fragilis* (gevrek söğüt – crack willow)
- *S. purpurea* (erguvani söğüt – purple willow)
- *S. viminalis* (bağ söğütü – common osier)

CORTEX SALICIS, Söğüt kabuğu (White Willow Bark)

- Contents
- SALICIN (Phenol glycoside)
- Tannins

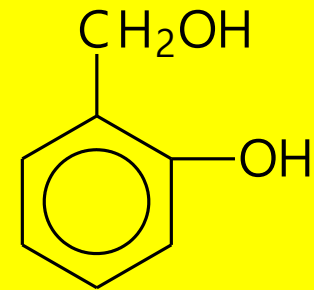


- Tonic property regarding tannin content of durg
- Glycoside → febrifuge, antirheumatic and antineuralgic.



SALICIN

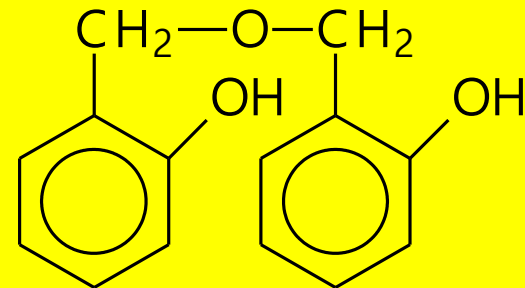
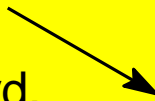
Enz. Hyd.



SALIGENIN
(Salicyl alcohol)

+ Gl

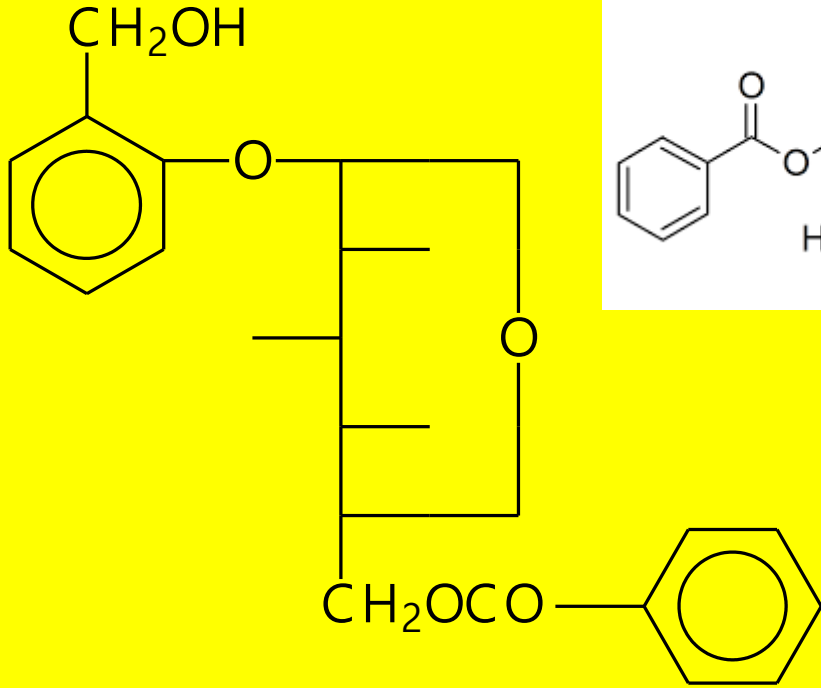
Acid Hyd.



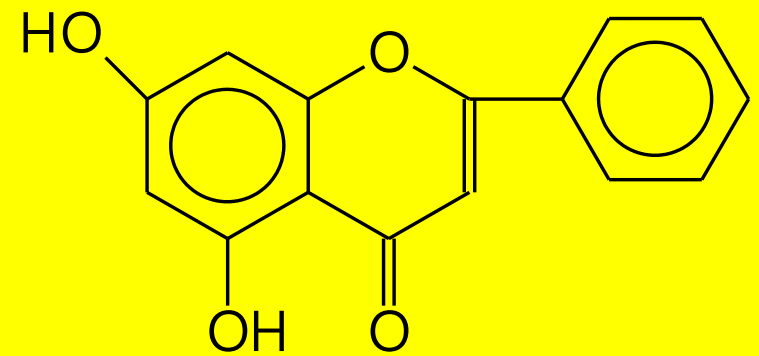
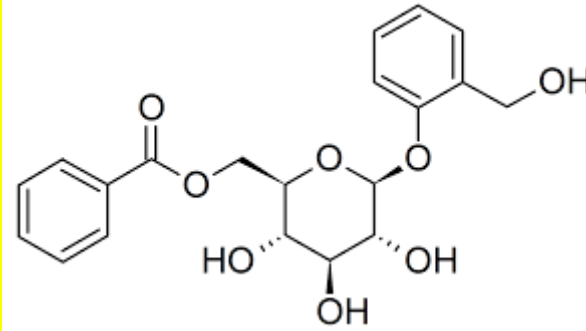
SALIRETIN
Dimer of aglycone

POPULI GEMMAE (TK), Black poplar buds, Karakavak tomurcuğu

- Flower and leaf buds of *Populus nigra* (Salicaceae) collected at the end of winter
 - 1-3 cm length, conic shaped
-
- **Contents;**
 - Phenol glycoside → Populin (populoside) (benzoyl salicoside)
 - Flavonoid → Chrysin derivative (flavon derivative)



POPULIN (Benzoyl salicin)



CHRYSIN DERIVATIVE (Flavon)

POPULI GEMMAE (TK),

Black poplar bud, Karakavak tomurcuğu

- **Used in the treatment of hemorrhoid as ointment**
- **Populin → painkiller**
- **Chrysin derivative flavon → increases capillary resistance**
- **Approved by Commission E**

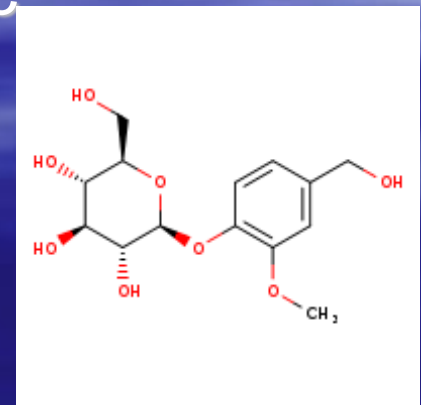
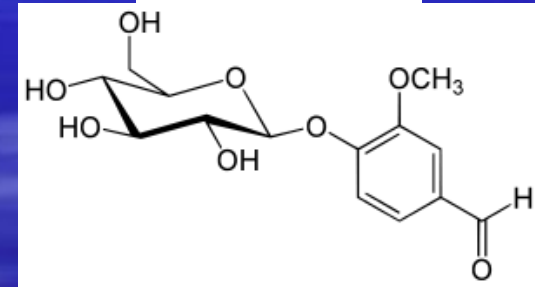
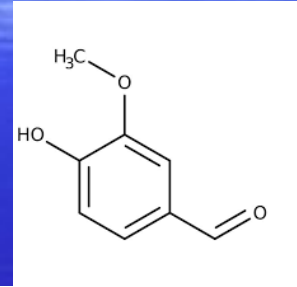
FRUCTUS VANILLAE (TK), Vanilla fruit, Vanilya meyvesi

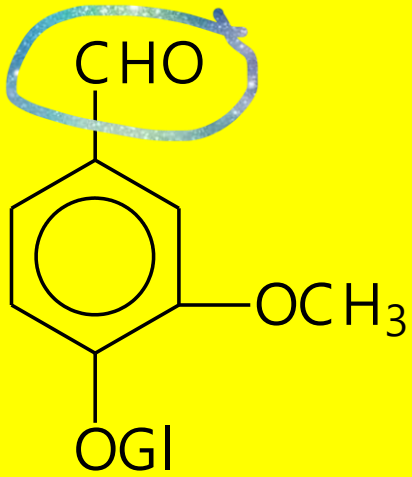
- Boiled and then dried immature fruits of *Vanilla planifolia* (Orchidaceae).
- Growing naturally and also cultured in Mexico, Java, Madagascar ve Antills.
- 15-25 cm, flat, sharp in 2 edges, bright black coloured
- Doesn't grow in Turkey

FRUCTUS VANILLAE (TK), Vanilla fruit, Vanilya meyvesi

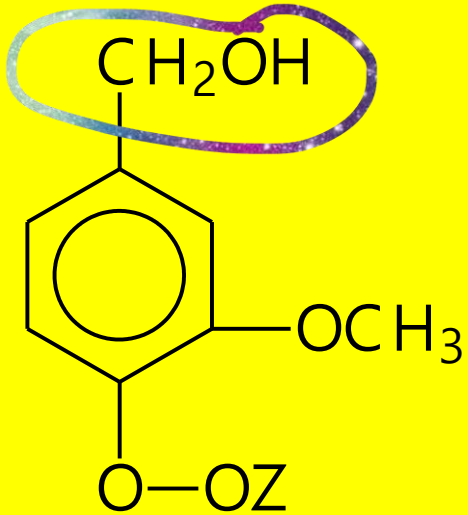
Contents;

- VANILLIN (VANILLAL) -----%1.5-2.5 →
(Fragrant compound)
- Its glycoside, found in fresh fruit is
VANILLOSIDE (Glucovanillin)----β-
glucosidase hydrolysis---Vanillin+gl
- VANILLOLOSIDE-----Glycoside of Vanillic
alcohol.





VANILLOSIDE (Glucovanillin)



VANILLOLOSIDE (Vanillic alcohol glycoside)

FRUCTUS VANILLAE (TK), Vanilla fruit, Vanilya meyvesi

- Weak choloretic activity
- Digestion stimulant
- Sexual power enhancer effect
- Used as odour improver in the pharmaceutical and food industries

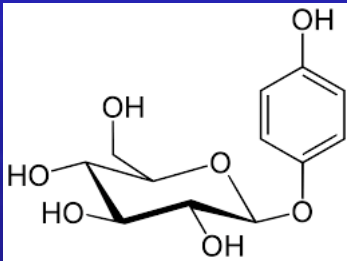
FOLIA UVAE URSI, Ayı üzümü yaprağı, Bearberry leaf

- *Arctostaphylos uva ursi* (Ericaceae)
- Growing in mountainous regions
- Europe, Asia, North America
- Doesn't grow in Turkey

FOLIA UVAE URSI, Ayı üzümü yaprağı, Bearberry leaf

Contents – Phenol glycosides;

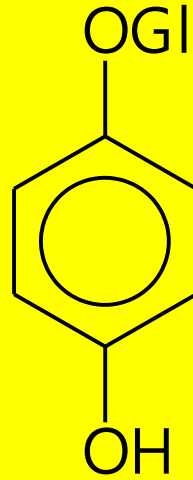
- ARBUTIN (hydroquinone derivative)----%5-10



- METHYL ARBUTIN (methyl hydroquinone derivative)



HYDROQUINONE



ARBUTIN



METHYL ARBUTIN

FOLIA UVAE URSI, Ayı üzümü yaprağı, Bearberry leaf

- Arbutin---hydrolysis---hydroquinol → quickly oxidized to hydroquinone
- Gallic tannin
- Flavonoids → Quercetin derivatives

FOLIA UVAE URSI, Ayı üzümü yaprağı, Bearberry leaf

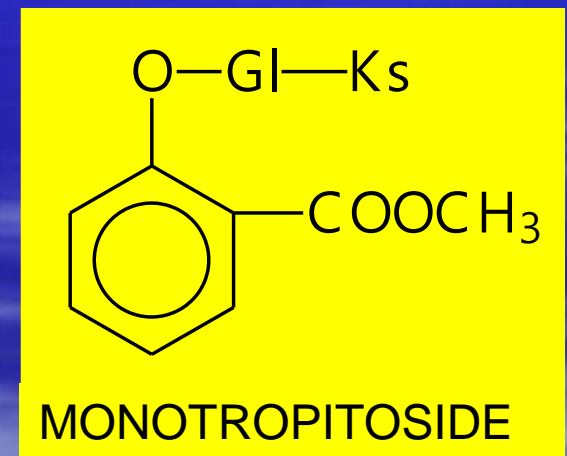
- Astringent due to tannin content
- Antiseptic for urinary system; extracts of this plant are used against cystitis, urethritis, pyelitis
- Antibacterial effect
- Aqueous leaf extract is effective against *Helicobacter pylori* due to tannic acid content

FLORES SPIRAEAE ULMARIAE (MEADOWSWEET)

- *Filipendula ulmaria* (*Spiraea ulmaria*)
(Rosaceae) ----keçi sakalı
- East Anatolia and Blacksea region
- North and South Europe, North America and North Asia
- Perennial, with yellowish white flowers

FLORES SPIRAEAE ULMARIAE (MEADOWSWEET)

- Phenol glycoside → MONOTROPITOSIDE---hydr.---methyl salicylate+gl+ks
- Flavonoid-----Spireoside (Quercetin 4'-O-glucoside)
- Tannins
- Essential oil



FLORES SPIRAEAE ULMARIAE (MEADOWSWEET)

- Antirheumatic due to phenol glycoside
- Diuretic due to flavonoid content
- Methyl salicylate → antimicrobial, antipyretic and diuretic
- Commission E approved the use of the drug in cold, bronchitis and fever