Class: Dicotyledones

MONOCOTYLEDONS	DICOTYLEDONS
Embryo with **1 cotyledon**	**Embryo** with **2 cotyledons**

MONOCOTYLEDONS	DICOTYLEDONS
Plants **annual** or **perennial, herbaceous**	Plants **annual** or **perennial, herbaceous** or **woody**

MONOCOTYLEDONS	DICOTYLEDONS
Fibrous root or mostly **rhizome, bulb, tuber etc. Are** present	**Root branched**, usually in the form of a **taproot**

MONOCOTYLEDONS	DICOTYLEDONS
Stem **simple, branching is only in the inflorescence.**	Stem usually **branched**

MONOCOTYLEDONS	DICOTYLEDONS
- Vascular bundles are irregularly arranged. . **- No cambium.** **- Secondary growth does not occur.** **- No differentiation between bark and the pith**	**- Vascular bundles are regularly arranged** **- Cambium is present and forms a circle.** **- Secondary growth is present in the stem and the root.** **- Differentiation between the bark and the pith is district.**

MONOCOTYLEDONS	DICOTYLEDONS
- Leaves sessile.	- Leaves with petiole.
- Lamina linear.	- Lamina whole or lobed, having different shapes.
- Venation usually parallel.	- Venation usually pennate; however palmate, pedate, reticulate and parallel venation systems are also seen.

MONOCOTYLEDONS	DICOTYLEDONS
- No cork tissue (periderm)	- Cork tissue is present

MONOCOTYLEDONS	DICOTYLEDONS
- **Floral parts are helically arranged.** - **Floral parts in multiples of three** (Trimeric flower) - **Calyx and corolla have the same color and shape, both are called perigonium.**	- **Flower parts are circularly arranged.** - **Floral parts usually 5** (Pentameric flower) - **Basic flower formula K_5 C_5 A_{5+5} G_5** - **Number of floral parts vary, may also be tetrameric.** - **Calyx and corolla have different colors and shapes ("Perianth")**

MONOCOTYLEDONS	DICOTYLEDONS
- **Polens monocolpate**	- **Polens tricolpate**

MONOCOTYLEDONS	DICOTYLEDONS
Endosperm usually present in the seed	**Seed w/o endosperm.**

Dicotyledones is divided into 3 subclasses according to the properties of their perianths:

Apetalae: Plants without perianth, or with scaly perianth (underdeveloped) or plants with only one member of the perianth.

Dialypetalae (with separate petals); With separate petals (or with both separate petals and sepals).

Sympetalae (Petals joint); Petals (or both petals and sepals) more or less joint.

Subclass: Apetalae

Perianth is absent (Achlamideae) or has only one circle of calyx and corolla (Monochlamideae); some are herbaceous, however most of them are woody.

Flowers monoic or dioic, not showy, forms amentum; some hermaphrodite.

Pollination is usually via the wind (anemogamous); some are entemogamous (pollination via insects).

Fam: Piperaceae

Grows in the tropics, rainy forests, perennial, shrubby or herbaceous; woody plants are evergreen.

Piper nigrum (Black pepper; Karabiber)

- 20-30 flowers without stalks form a drooping spica.

- Fruit small, without stalk and numerous.

- Two types of drugs are prepared from this plant:

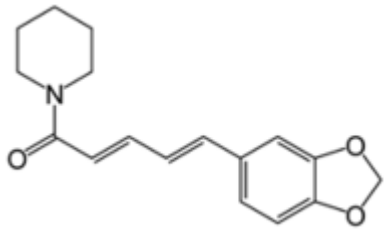
Fructus Piperis nigri (Piperis nigri fructus), fruits are collected before getting mature and then dried.

Green color of the drug when fresh turns to greyish-black during drying.

Contains essential oil (1-2.5%), an alkaloid called piperine (5-9%) and resin.

Stomachic and antipyretic*, also used as spice.

(*antipyretic: reducing or tending to reduce fever)



Also used in common cold with honey.

Fructus Piperis albi (Piperis albi fructus) (White pepper): Fruits are collected after totally matured, are dried and then black pericarp is peeled off and a light colored drug is obtained.

Usage is identical to Piperis nigri fructus.

Piper cubeba

(Cubeb, kübabe)

Fruits are collected before getting mature: Fructus Cubebae (Cubebae fructus) (T.K.), Though resembles black pepper, can be easily differentiated with its stalk like extension (pseudopeduncul).

Contains volatile oil, an alkaloid called cubebine and a resinol
Strongly antiseptic* especially for the kidneys and urinary tract.

Though used as spice like black pepper, it is not pungent as black pepper.

(*antiseptic: Capable of preventing infection by inhibiting the growth of microorganisms)

Piper longum

(Long pepper, Darü fülfül)

Yields Fructus Piperis longi (Piperis longi fructus) (length 4 cm, diameter 6 mm).

Piper methysticum
(Kava kava)

Rhizomes with dimensions of 60 cm x 8 cm give the drug called Rhizoma Piperis methystici (Piperis methystici rhizoma).

Grows and cultured in tropical countries like New Zealand. Shrub up to 7 m.

Leaves are cordate, 25 cm, petiole is 4-6 cm long. Inflorescence is a spadix.

Kava rhizomes are grinded in the Pacifics and mixed with water: a local drink called KAVA is obtained.

Used in stomachaches and cramps, headache.

Also known for its sedative* and tonic effect.

(*sedative: Having a soothing, calming, or tranquilizing effect; reducing or relieving anxiety, stress, irritability, or excitement)

Contains kavain, dihydrokavain, methysticin and yangonin also known as kava lactones.

The amount of total kava lactones should not be less than 3.5%.

Usage: Insomnia and stress related anxiety and nervous disorders. Also has anticonvulsant and antispasmodic effect.

(*anticonvulsant: A drug that prevents or relieves convulsions (convulsion: an intense, paroxysmal, involuntary muscular contraction)

Piper betle (Betel)

Origin: East Asia.

Used by local people in the preparation of a mixture that relieves excessive stomach acid and increase saliva.

A piece of lime is smeared onto the fresh leaves of the plant, then stuffed with *Areca catechu* seeds and *Eugenia caryophyllata* blossoms.

Order: **Salicales**

In this order, plants with deciduous leaves, dioic flowers forming amentums (catkins) are present. Has a single family.

Salicaceae (Willow Family)

The family has two cosmopolite genera: *Salix* and *Populus*

***Salix* (willow), entemogamous and has one scale in the bud;**

Differentiated from *Populus* (poplar) species with:

- **lanceolate-linear or eliptic leaves**
- **less number of stamens (2-5) and lancceolate leaves**

- with upright male catkins.

Salix alba

(White willow, Ak söğüt)

Salix babylonica

(Weeping willow, Salkım Söğüt)

- **Other *Salix* spp:**

- ***Salix viminalis* (Common Osier Willow, Sepetçi söğütü)**
- ***Salix caprea* (Goat Willow, Keçi Söğüdü, Sorgun)**
- ***Salix triandra* (Almond willow, Almond-leaved willow)**
- ***Salix pentandra* (Bay willow, Laurel willow)**
- ***Salix purpurea* (Purple willow, Purple osier)**

A carminative drug called Carbo Ligni is prepared from the wood of willow species.

Barks of *Salix alba* and other species yield Cortex Salicis (Salicis cortex) (Willow tree bark).

Contains salicoside and ample amount of tannins.

Antipyretic, Antiseptic, Hemostatic*, Antirheumatic**

(*hemostatic: Acting to arrest bleeding or hemorrhage; **antirehumatic: against rheumatism (rheumatism: any disorder of the connective tissue structures of the body, especially those in the back or the extremities, characterized by pain or stiffness)

In ancient Sumerian and Egyptian records, willow barks are stated to be used for the treatment of pain and fever.

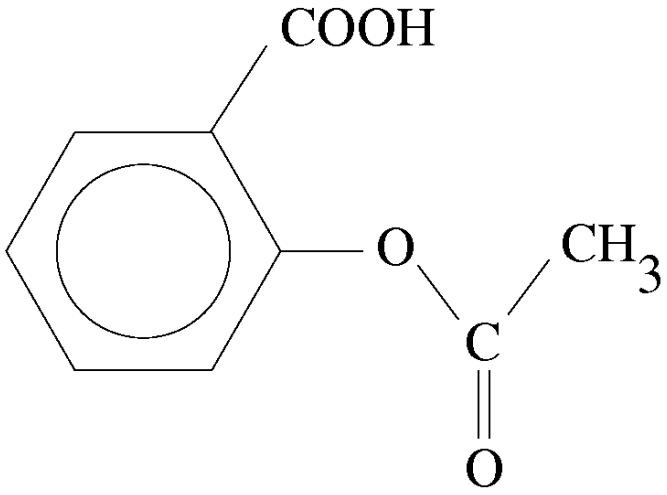
Hippocrates stated in 5 B.C. that willow is used as a drug.

Natives of America are also known to use the drug.

However the side effects of salicylates (especially on the stomach) limited their usage in the middle of 19th century.

In 1890, Bayer company started working on these group of substances and in 1897 a young chemist named Dr. Felix Hoffmann synthesized the active substance of aspirin, acetyl salicylic acid in pure form for the first time.

This new compound resulted in less stomach problems and became the mostly used drug of the world in time.



Acetyl Salicylic Acid

Populus sp. (Poplar, Kavak)

Differentiated from willow trees with wide-elliptic, ovate or cordate leaves.

Trembling of the leaves with the wind is also a characteristic property.

Populus nigra
(Black Poplar, Kara kavak)

Up to 30 m, with a short trunk, long branches forming a wide corona.

The trunk is pale brown and has processes like tubers on.

Leaf and flowerbuds yield Gemmae Populi (Populi gemma) (T.K.),

Contains salicoside and populoside, tannins, volatile oil. Pommades prepared with this drug are used in the treatment of hemorrhoid* and burns.

Also yields Carbo Ligni and used as carminative.

(*hemorrhoid: an itching or painful mass of dilated veins in swollen anal tissue)

Populus alba
(White poplar, Ak kavak)

Cultured for its wood and as an ornamental tree.

Has light and porous wood.

Populus tremula

(Eurasian Aspen, Titrek kavak)

Has more or less rotundate leaves with sinuate margins. Petiole is flat and perpendicular to the lamina and the leaves swing even in the slightest wind.

Fam: Juglandaceae (Walnut Family)

Juglans regia (Walnut, Ceviz)

Origin: Anatolia.

18-20 m, up to 30 m.

Short and thick trunk forms a wide corona, has greyish bark, deep cracks are formed on the bark with ageing.

Imparipennate bright green leaves with 5-foliols.

Fruit is a globoid drupe.

Pericarp green, exocarp and mesocarp gets black in time and separate from the woody endocarp.

Folia Juglandis (Juglandis folium) contains; tannin, volatile oil, bitter substance and juglone. Has astringent* and tonic activity.

(*astringent: A substance or preparation, such as alum, that draws together or constricts body tissues and is effective in stopping the flow of blood or other secretions)

Green pericarp is used in wool dyeing, leaf and pericarp extratcs are also used in cosmetics.

Gives shades of brown.

Fruit yields fixed oil (Walnut Oil)

Order: FAGALES

Monoecious trees, shurbs. Flowers are unisexual and open before leaves, leaves simple and alternate. Ovary inferior.

	Betulaceae	Fagaceae	Corylaceae
Male flowers	pendant amentum	pendant round amentum	pendant amentum
Female flowers	erect or pendant amentum	single/2-3 flowers small erect group	pendant amentum/ erect spike
Fruit	nuts with wings	nuts (pelit)	nuts-pericarp

Fam: Corylaceae

Corylus **sp. (Hazelnut tree, Fındık)**

Seeds contain vast amount of fixed oil.

Corylus avellana **(Common hazel, Fındık),** ***C. colurna*** **(Turkish hazel),** ***C. maxima*** **(Filbert)**

Fam: Betulaceae

(Birch Family, Huşgiller)

Betula pendula (*B. verrucosa*, *B. alba*)

(Birch Tree, Huş Ağacı)

Dry distillation of the bark of this tree yields Pix Betulae (Pix Betulinae T. K). (Betulae pix) and is used as antiseptic in skin disorders externally.

Leaves are known to be diuretic.

Betula pubescens (White birch)

This species also yields
Betulae pix.

Betula lenta

(Sweet Birch, Black Birch)

Barks yield volatile oil with steam distillation and is used in relieving rheumatism pain externally due to its high methyl salicylate content.

Fam: **Fagaceae**
(Beech Family, Kayıngiller)

Fagus sylvatica
(European beech, Avrupa kayını)

Common in Europe.

Barks and branches yield Pix Fagi (Fagi pix) with dry distillation. Rich in creosote. Used externally in rheumatism and skin disorders (as an antiseptic).

CASTANEA SATIVA (CHESTNUT, KESTANE)

Fruit: Contains starch, carbohydrates, proteins, tannins

Quercus sp. (Oak, Meşe)

Cupula is usually hard, woody and covered with imbricate scales, covers the base of the fruit, which is actually a nut called pelit.

Drug yielding species:

Quercus infectoria (Dyer's Oak, Mazı meşesi)

Cynips gallae tinctoria (mazı arısı) leads to the formation of a pathological product called **Gallae Quercinae.**

Contains 50-70% tannin,
therefore is astringent
Tannic acid + albumin=
Tanalbin
Leads to constipation

Gallae Quercinae

Quercus ithaburensis subs. *macrolepis*
(Q. macrolepis, Q. aegilops)
(Valonia Oak, Palamut meşesi)

Valonea (Palamut kadehi)

Cupula contains - 30-40%

Trillo (scales) contains 45% tannin

Roasted pelits of *Quercus macrolepis*
(or *Q. pedunculata* and *Q. sessiliflora*)
yields
Semen Quercus tostum (Quercus semen tostum)
Used in the diarrhea* of children.

(*diarrhea: excessive and frequent evacuation of watery feces, usually indicating gastrointestinal distress or disorder)

Other *Quercus* species:

Q. pseudocerris (Hatay meşesi)

Q. pedunculata (Pedunculate Oak, English Oak, Saplı meşe)

Q. sessiliflora (Sessile Oak, Sapsız meşe)

Q. suber (Cork Oak, Mantar meşesi)

Q. coccifera (Kermes Oak, Kermes meşesi) – gives red dye

Order: Urticales

Herbaceous or woody plants.

Fam: Moraceae
(Mulberry Family)

Morus sp. (Mulberry, Dut)

Female inflorescence is a catkin (amentum).

Morus alba
(White Mulberry, Beyaz dut)

Has white fruits as it can be understood from the Latin name of the plant.
Consumed as fresh or dried, molass is prepared and the leaves are used to feed silkworms.

Morus nigra
(Black mulberry, Kara dut)

Fruits are blackish-purple colored and have bittersweet taste.

Yields Syrupus Mori and is used in aphthae* (especially in children).
Contains mucilage, dye substance (cyanin), pectin and vitamin C.

(*aphtha: a small ulceration on a mucous membrane, as in thrush, caused by a fungal infection)

Root and stem barks
(Cortex Mori nigrae-Mori nigrae radix cortex) are anthelmintic*.

(*anthelmintic: An agent that destroys or causes the expulsion of parasitic intestinal worms)

Ficus carica
(Fig tree, İncir ağacı)

Pollination is provided by
Blastophaga grossorum

The receptaculum also grows and becomes fleshy and forms a pseudo-fruit (Fructus Caricae – Caricae fructus) consumed as food.
Rich in sugar: laxative*

(*laxative: A food or drug that stimulates evacuation of the bowels)

- **Other important species:**

Ficus elastica **(Rubber tree, Lastik ağacı, kauçuk)**

Ficus religiosa **(Sacred fig),** ***F. lactifera***
Gummi Laccae (gomalak) Resin

Maclura pomifera **(Osage orange, Yalancı portakal ağacı)**
Yellowish orange dye

Both drugs are sedatives.

It is also used in the making of beer.

Cannabis sativa
(Hemp, Kenevir, kendir, esrar otu)

Origin: India.
Therefore it is also known as
Indian Hemp

Branches with female flowers and leaves give Herba Cannabis indicae (Cannabis herba); sedative and hypnotic*

Palmate leaves with 5-11 foliols. Foliols lanceolate, margins serrate.

(*hypnotic: Inducing or tending to induce sleep)

Female flowers contain resin, they are grinded and kneaded into a mass called marijuana.

Contains the hypnotic (narcotic*) substance called tetrahydro cannabinol. Addiction rapidly develops therefore is harmful to the community.

(*narcotic: an addictive drug, such as opium, that reduces pain, alters mood and behavior, and usually induces sleep or stupor. Natural and synthetic narcotics are used in medicine to control pain)

Therefore marijuana usage and selling is PROHIBITED!