Practical Pharmacognosy

3rd. Stage

1st semester

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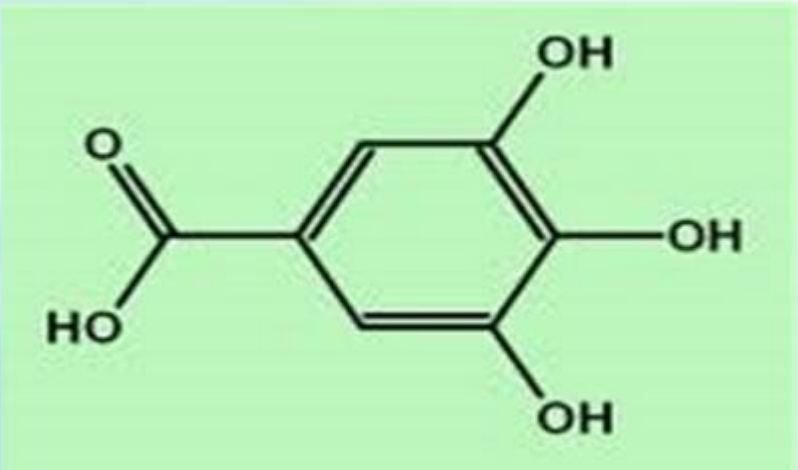
Lab.3

Tannins

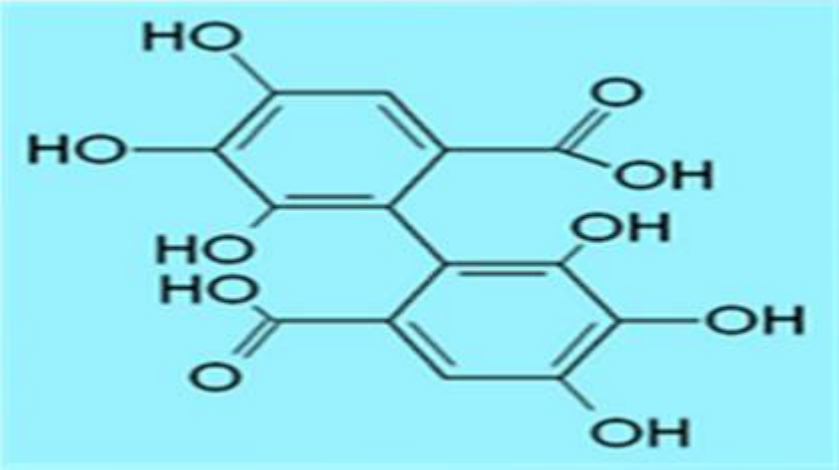
- Tannins compromise a large group of complex substances that are widely distributed in the plant kingdom.
- Chemically tannins are **complex substances**; they usually occur as mixtures of **poly hydroxyl phenols** that are difficult to separate because they **do not crystallize**.
- Tannins are divided according to the identity of the phenolic nuclei involved, and on the way they are joined into two classes:

1 .Hydrolysable tannins:

- This class consists of **gallic acid** and related polyhydroxy compounds **(hexahydroxydiphenic acid)** and their derivatives esterified with glucose.
- They are termed **hydrolysable tannins** due to **ease of esters to hydrolyze** to phenolic acids and sugar.
- They were formerly known as **pyrogallol** tannins.



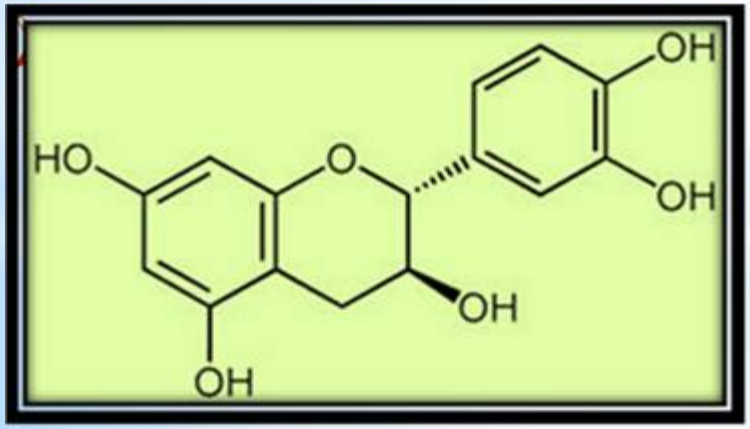
Gallic acid



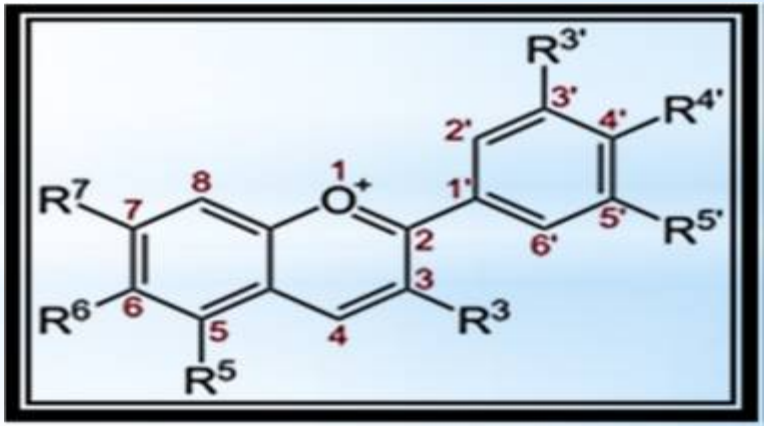
Hexahydroxydiphenic acid

2. Nonhydrolysable tannins or condensed tannins:

- This class contains **onlyphenolic nuclei** but frequently linked to **carbohydrates or proteins**.
- When treated with hydrolytic agents, these tannins tend to polymerize, yield insoluble usually red-colored products known as **phlobaphenes**.
- The name (condensed tannins) is due to the fact that on the treatment with hot acid some of C-C bonds are broken yielding **anthocyanidin monomers**. These tannins are sometimes called **catechol tannins**.



Catechin



Anthocyanins

(Are glucosides of anthocyanidins)

General properties of Tannins:

- Tannins are non–crystallizable compounds that,with ***water*** .form ***colloidalsolution*** possessing acid reaction and sharp "***puckering*** "taste.
- They cause precipitation of solution of ***gelatin*** as well as ***alkaloids***.
- They form dark ***blue***, ***greenish***black soluble compounds with ***ferric salts.***
- They produce deep ***red*** color with ***potassium ferricyanide*** and ***ammonia.***
- They are precipitated by salts of ***copper***, ***lead*** and ***tin*** by strong aqueous ***potassium dichromate*** or ***1%chromic acid*** solution. In alkaline solutions; many of their derivatives readily absorb oxygen.
- Tannins precipitate ***proteins*** from solution and can combine with proteins, rendering them resistant to proteolytic enzymes .when applied to living tissue this action is known as an"***astringent"*** action and form the basis for therapeutic application of tannins.

Uses of tannins:

1.**Astringents**, used in the gastrointestinal tract and on the skin abrasion.

2.In the **treatment of burns**, the proteins of the exposed tissue are precipitated and form amildly antiseptic protective coat under which the regeneration of new tissue may take place.

3.Use in the process of vegetable- tanning which converts animal hides to leather (**leather industry**).

4.**Antidote** treatment of alkaloids poisoning.

5.**Ink industry.**

Pyrogalloltannins(Nut gall)

Catechole tannins(Hamamelis leaf)

Isolation & Identification of the Tannins.

Aim: Isolation of the Tannins.

Equipment :

- Medium size beaker.
- Conical flasks.
- Heater.
- Filter paper.
- Funnels.

Reagents:

Distill water.

Procedure

Method of extraction: Decoction.

Plant used: Cinnamon.

family: Lauraceae.

Part used: Dry bark.

Add *2gm* of cinnamon, coarsely powdered to a beaker.

↓

Add *30ml* of distill water.

↓

Boil for *5-10 mins*.

↓

Filter.

↓

The filtrate will resemble the *Tannin* extract.

The Chemical Tests:

(Ferric Chloride Test)

Aim: Identity test for Catechol Tannins.

Equipment & Reagents:

-Test tube.

-Pipette.

-Ferric chloride.

-Distill water.

Procedure:

-Add 2ml of the extract to the test tube.

-Add 2ml of distill water.

-Add 2 drops of ferric chloride.

Results:

Green-Black color will be produced which indicates condensed tannins.

Discussion

- The ferric chloride test is used to determine the presence of the **phenolic nuclei** present in the tannin molecule.
- Phenols form a complex with ferric ions. This complex has an intense dark-green color.
- $6\ PhOH + Fe^{3+} \rightarrow [Fe(OPh)_6]^{3-}$


Thank You