**Glycoside dr. Saba hadi lec.2**

**is a** [**molecule**](https://en.wikipedia.org/wiki/Molecule) **in which a** [**sugar**](https://en.wikipedia.org/wiki/Sugar) **is bound to another** [**functional group**](https://en.wikipedia.org/wiki/Functional_group) **via a** [**glycosidic bond**](https://en.wikipedia.org/wiki/Glycosidic_bond)**. Glycosides play numerous important roles in living organisms. Many plants store chemicals in the form of inactive glycosides. These can be activated by** [**enzyme**](https://en.wikipedia.org/wiki/Enzymatic)[**hydrolysis**](https://en.wikipedia.org/wiki/Hydrolysis)**, which causes the sugar part to be broken off, making the chemical available for use. Many such plant glycosides are used as** [**medications**](https://en.wikipedia.org/wiki/Medication)**. In animals and humans, poisons are often bound to sugar molecules as part of their elimination from the body.**

**OR organic natural compounds present in a lot of plants and some animals, these compounds upon hydrolysis give one or more sugars (glycone) form and non sugar (aglycone) or called genin.** **The first glycoside ever identified was** [**amygdalin**](https://en.wikipedia.org/wiki/Amygdalin)**, by the French chemists** [**Pierre Robiquet**](https://en.wikipedia.org/wiki/Pierre-Jean_Robiquet) **and** [**Antoine Boutron- Charlard**](https://en.wikipedia.org/w/index.php?title=Antoine_Fran%C3%A7ois_Boutron_Charlard&action=edit&redlink=1)**, in 1830.**

* The hydroxyl group of aglycone may be alcoholic or phenolic and in some cases amines also.
* The sugars involved in glycosides are of different types, but most commonly it is β\_ D-glucose 
* The other sugars found are galactose, mannose, rhamnose, digitaxose, cymarose, etc.
* Plants produce only β\_ glycosides
* The linkage between glycone and aglycone is called glycosidic linkage.
* **Properties glycosides.**

**1-Solids non-volatile, colorless crystalline and amorphous visits taste some sweet taste.**

**2-Generally soluble in water and alcohol and insoluble in ether, although some were dissolved in organic solvents such as acetone and chloroform solubility complexity of the chemical composition vary glycone and aglycone.**

* **Uses of glycosides as Medicines .**

**Of not less glycosides much about alkaloids in medical benefits and effects of physiological and even play an important role in human life and treatment of many diseases, and glycosides saved the lives of millions of people it is a stimulant and tonic for the heart and the Organization of the heart beat of this named cardiecstimi ex. Digoxin and Rutin Which strengthens the walls of blood vessels weak and prevent the bleeding ,glycosides laxativeكملين (Sennosid) and glycosides analgesic for pain Salicin .**

**Classification**

**Glycosides can be classified by the glycone, by the type of glycosidic bond, and by the aglycone.**

1. **By glycone /presence of sugar**

**If the glycone group of a glycoside is** [**glucose**](https://en.wikipedia.org/wiki/Glucose)**, then the molecule is a** [**glucoside**](https://en.wikipedia.org/wiki/Glucoside)**; if it is** [**fructose**](https://en.wikipedia.org/wiki/Fructose)**, then the molecule is a** [**fructoside**](https://en.wikipedia.org/wiki/Fructoside) **; if it is** [**glucuronic acid**](https://en.wikipedia.org/wiki/Glucuronic_acid)**, then the molecule is a** [**glucuronide**](https://en.wikipedia.org/wiki/Glucuronide)**; etc. In the body, toxic substances are often bonded to glucuronic acid to increase their water solubility; the resulting glucuronides are then excreted.**

1. **By type of glycosidic bond**

**Depending on whether the glycosidic bond lies "below" or "above" the plane of the cyclic sugar molecule, glycosides are classified as α-glycosides or β-glycosides. Some enzymes such as** [**α-amylase**](https://en.wikipedia.org/wiki/Amylase) **can only hydrolyze α-linkages; others, such as** [**emulsin**](https://en.wikipedia.org/wiki/Emulsin)**, can only affect β-linkages.**

**There are four type of linkages present between glycone and aglycone:**

**1-C-linkage/glycosidic bond, "nonhydrolysable by acids or enzymes"**

**2-O-linkage/glycosidic bond**

**3--N-linkage/glycosidic bond**

**4-S-linkage/glycosidic bond**

1. **By aglycone**

**Glycosides are also classified according to the chemical nature of the aglycone. For purposes of biochemistry and pharmacology, this is the most useful classification.**

1. **Alcoholic glycosides.**

**An example of an alcoholic glycoside is salicin, which is found in the genus salixنبات الصفصاف . Salicin is converted in the body into salicylic acid, which is closely relatedيرتبط to aspirin and has analgesics' , antipyreticخافض حرارة , and anti inflammatory effectsمضاد للالتهابات .**

1. **Anthraquinone glycosides.**

**These glycosides contain an aglycone group that is a derivative of anthraquinone. They have a laxative effect. تأثير مسهل They are mainly found in dicot plants except the Liliaceae family which are monocots. They are present in sennaالسنامكي , rhubarb راوند and Aloe species الصبير . Antron and anthranol are reduced forms of anthraquinone.**

1. **Phenolic glycosides.**

 **Here, the aglycone is a simple phenolic structure. An example is arbutin found in the Common Bearberry Arctostaphylos uva-ursi.عنب الدب It has a urinary antiseptic effectتأثير مطهر .**

1. **Flavonoid glycosides.**

 **Here, the aglycone is a flavonoid. Examples of this large group of glycosides include :**

[**Hesperidin**](https://en.wikipedia.org/wiki/Hesperidin) **(aglycone:** [**Hesperetin**](https://en.wikipedia.org/wiki/Hesperetin)**) يستخلص من الثمار غير الناضجة للحمضيات الليمون الاخضر وقشور البرتقال**

**Rue (Rute graveolens) نبات السذب**

,**[Rutin](https://en.wikipedia.org/wiki/Rutin%22%20%5Co%20%22Rutin) (aglycone:**  [**Quercetin**](https://en.wikipedia.org/wiki/Quercetin) **)**

**Among the important effects of flavonoids are their [antioxidant](https://en.wikipedia.org/wiki/Antioxidant%22%20%5Co%20%22Antioxidant) effect. They are also known to decrease** [**capillary**](https://en.wikipedia.org/wiki/Capillary) **fragility.تقليل نفاذية الاوعية الشعرية**

**e-Steroidal glycosides or cardiac glycosides.**

**Here the aglycone part is a steroidal nucleus. These glycosides are found in the plant genera Digitalis, Scilla, and Strophanthus. They are used in the treatment of heart diseases.**

**f-Coumarin glycosides**

**In this case, the aglycone is coumarin. An example is apterin, which is reported to dilate تمددthe coronary arteries as well as block calcium channels. Those obtained from dried leaves of Psoralia corylifolia have the main glycosides psoralin and corylifolin.**

####  g -Saponins

 **These compounds give a permanent froth مستحلب مع مادة دهنية when shaken with water. They also cause hemolysis of** [**red blood cells**](http://www.newworldencyclopedia.org/entry/Red_blood_cell)**. Saponin glycosides are found in liquorice عرق السوس . Their medicinal value is due to their expectorant effect طارد للبلغم .**

#### H- Thioglycosides

**As the name implies, these compounds contain** [**sulfur**](http://www.newworldencyclopedia.org/entry/Sulfur)**. Examples include sinigrin, found in black mustard خردل الاسود , and sinalbin, found in white mustard خردل الابيض .**

**I-Cyanogenic glycosides**

**In this case, the aglycone contains a cyanide group, and the glycoside can release the poisonous hydrogen cyanide if acted upon by some enzyme. An example of these is amygdalin from almonds seed.بذور اللوز المر**

* **glycosides** **importance for plants**

**1-have an important role to play in the Champions toxicityابطال سمية of some of the material and then convertsتحويلها it to** **glycosides**

**2-Its presence in seeds and parts of plants considered as a store of energy they provide for the growth of the seeds and to provide plants of construction materials for plant synthesis.**

**3- When the plant wound for some reason the glycosides a defensive role against some types of microbes and trying to prevent its entry into the plant.**

**4-** **Association with the sugar helps to ease the process of spread of plant nutrients.**