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BIOLOGICAL ROLE OF GLYCOSIDES

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Abstract. This article describes glycosides found in plants, their classification, and physicochemical properties.

Keywords: glycoside, aglycone, configuration, glycosidic bond, hydrolysis.

Glycosides are a widespread form of existence of many natural substances. Glycoside molecules consist of two parts: the main, non-sugar part, called aglycone or genin, and the sugar part, called glycone. Using the name "glycosides" without the name aglycone has only one purpose - to show the presence of a sugar component in the composition of molecules of substances of different chemical nature. Therefore, it should be remembered that glycosides are always glycosides of certain aglycones contained in the cells and tissues of plant and animal organisms, which have their own origin and metabolic function.

Among monosaccharides, a distinction is made between glycopyranosides (six-membered ring) and glycofuranosides (five-membered ring). In addition, depending on the α - or β -configuration of the hemiacetal hydroxyl monosaccharide through which the connection with the aglycone occurs, α - and β -glycosides are distinguished.

The hydroxyl at the C1 atom of sugar, as a rule, differs sharply from others in its high reactivity, i.e., the ability to form glycosidic bonds. If the connection of sugar with an aglycone is carried out through an oxygen atom, then such glycosides are called O-glycosides, if directly through the interaction of two carbon atoms - C-glycosides, if through a sulfur atom - S-glycosides, if through a nitrogen atom - N-glycosides. The most common are O glycosides that form ether-like bonds. The diversity of glycosides is determined not only by the aglycone and the form of the glycosidic bond, but also by the quantity (1 - mono, 2 - bi, 3 -

tri, 4 - tetra, 5 - penta, 6 - hexo, etc.) and the quality of sugar (hexosides - glucosides, fructosides; pentosides - arabinosides, xylosides, etc.; the sugar part may also contain uronic acids - glucuronosides, galacturonosides, etc.). Glycosides can split off one or another part of the sugar chain (incomplete, stepwise hydrolysis) or completely decompose into aglycone and sugar under the influence of certain physical or chemical factors. Glycosides are often hydrolyzed by enzymes (enzymatic hydrolysis), acids (acid hydrolysis), alkalis (alkaline hydrolysis), and some decompose even when boiled with water (temperature aqueous hydrolysis). As a rule, this applies to O-, S- and N-glycosides, but not to C-glycosides, which differ from the former in their higher resistance to hydrolysis. Glycosides are found in various parts of plants (aboveground or underground), the vast majority of them are located in vacuoles, that is, dissolved in cell sap. Glycosides isolated from medicinal plant materials are dry crystalline substances, soluble in water (the more sugars in the glycosidic chain, the better), as well as in aqueous solutions of alcohols, alcohols, but almost insoluble in ether, acetone, chloroform and other organic non-polar solvents.

Precipitated by solutions of lead acetate and tannin. Solutions of glycosides have optical activity. In order to inactivate hydrolases that break down glycosides at a greater or lesser rate in freshly harvested medicinal plant, it is dried. Under the influence of high temperature, as well as as water evaporates from plant tissues, the hydrolytic activity of enzymes decreases sharply. It is known that most plant hydrolases exhibit optimal activity at temperatures of 25–30⁰ C; when the temperature decreases to 0⁰ C and when it rises to 40⁰ C, the activity of hydrolases decreases greatly, and at 60-70⁰ C denaturation of enzyme proteins occurs. Based on the foregoing, we can conclude: in order to maximize the preservation of glycosides in medicinal products, its drying should be fast and take place in a technological mode that is optimal for specific biologically active substances.

Thio-, or mercaptoglycosides, are compounds of L-thiosaccharides, in the HS group of which the hydrogen atom is replaced by an aglycone R. Glycosides

of this group are resistant to acid hydrolysis, but alkalis break them down into their original components - a thiosaccharide and often a complex aglycone. During hydrolysis, the latter breaks down into components, among which there is always a sulfur-containing essential oil. S-glycosides are broken down by thiohydrolase enzymes. Thioglycosides are characteristic of species of the Brassica (Cruciferous) family and are found in larger or smaller quantities in vegetables belonging to this family: cabbage, horseradish, radish, rutabaga, turnip, mustard, etc. Mustard glycoside has the most pungent taste and strong irritating effect - sinigrin. The listed plants, thanks to the thioglycosides they contain, have long been used as raw materials for the production of drugs, which in small quantities stimulate the appetite, and in large quantities have a local irritating and distracting, as well as antimicrobial effect.

References

1. Karpuk V.V. Pharmacognosy. Minsk, 2010.
2. Muravyova D.A. Pharmacognosy. M.: Medicine, 1991.
3. Dolgova A.A., Ladygina E.Ya. Guide to practical exercises in pharmacognosy. M.: Medicine, 1977.
4. Konopleva M.M. Pharmacognosy: natural biologically active substances. Vitebsk, 2002.