Pindus Journal Of Culture, Literature, and ELT
ISSN: 2792 – 1883 **Volume 11**
https://literature.academicjournal.io

SPECIFIC PROPERTIES OF ORGANIC COMPOUNDS

Sadiqova Adolat Maratovna *– assistant.*
Berdakh Karakalpak State University
Begimanova Gauxar Elbaevna *- assistant.*
Berdakh Karakalpak State University
Matsalaeva Sayyora Zaripbaevna *– assistant.*
Nukus branch of Samarkand Veterinary Medical Institute

Annotation: *The largest class of organic compounds are carbohydrates, which, when hydrolyzed, are divided into two groups according to whether they are hydrolyzed or broken down into smaller molecules:*

1. Simple carbohydrates or monosaccharides (mannoses);

2. Complex carbohydrates. These are subdivided into sugar-like small-molecule polysaccharides (oligosaccharides) and high-molecular-weight polysaccharides that do not resemble sugar.

Key words. *Ketone, aldehyde, oxide, oligosaccharide, monosaccharide, molecule, hydrolysis, organic compound.*

The fact that the reforms carried out in our country in recent years have resulted in huge economic growth, further increases the demand for qualified personnel and qualified specialists in all areas. This in itself requires increasing the interest of our students in the lessons and increasing the attention of teachers to comprehensive education. The fact that the above requirements are very important for the education system means that, as in most foreign countries, it is necessary to attract best practices to improve the quality of education by assessing and monitoring the development of education and science.

Organic compounds or organic molecules are chemicals that contain carbon atoms. Therefore, the department of chemistry responsible for its study is called organic chemistry. Organic chemistry is a large and independent branch of chemistry, which studies the structure of hydrocarbons and their derivatives, methods of production, properties, possibilities of practical use. The peculiarity of organic compounds is that the presence of carbon in organic compounds and its combination with other elements and other carbon atoms through covalent bonds can form a long carbon chain, due to the presence of carbon and hydrogen in organic compounds, they anhydride and water are formed, the temperature of liquefaction and decomposition is much lower than that of inorganic compounds, organic matter is unstable to inorganic matter, easily changes under the influence of temperature, organic compounds, unlike most inorganic compounds, do not dissociate and are non-electrolytes. isometry occurs in compounds.

Russian scientist A.M. Butlerov proposed a theory of the chemical structure of organic compounds. This theory is described as follows: The chemical nature of a complex particle is determined by the nature of the material particles that make up its composition, their quantity and chemical structure. The degree of oxidation of a carbon atom in organic compounds does not always correspond to the number of bonds it forms, ie it is not equal to the valence of this element. In organic compounds, the carbon atom is always IV valent. However, the oxidation state of a carbon atom has

different values, from -4 to +4. We know from the subject of chemical bonds in general chemistry that when a chemical bond is formed between two different atoms, the bonding electron pair moves towards the atom of the element with the greatest electronegativity. For example, in the C - H bond, the electronegativity of a carbon atom is 2.5 and that of a hydrogen atom is 2.1. This means that the electron pair (C: H) will move towards the carbon atom.

Organic compounds are divided into the following classes according to their composition:

1. Hydrocarbons. These are compounds that contain only carbon and hydrogen atoms.
2. Compounds containing carbon and hydrogen as well as oxygen atoms are called oxygenated organic compounds.
3. Compounds that contain a nitrogen atom in addition to carbon and hydrogen atoms are called nitrogenous organic compounds.

Organic compounds, like inorganic compounds, undergo exchange, aggregation, and separation reactions.

1) The reactions that take place by exchanging atoms in an organic molecule with atoms in another molecule are called exchange reactions.
2) Reactions that occur by combining organic substances with other molecules are called coupling reactions.
3) The decomposition of an organic compound into several different molecules is called a decomposition reaction.

There are also types of reactions that are unique to organic compounds. Examples are polymerization and polycondensation reactions.

Monosaccharides can be thought of as oxidized products of aliphatic polyols. This is because these substances contain hydroxyl groups as well as aldehyde or ketone groups. However, monosaccharides do not undergo hydrolysis. The name of a monosaccharide is formed by reading the number of carbon atoms in their molecule by adding the suffix "oza" to the Latin name. Monosaccharides with the aldehyde group are called aldoses, and those with the ketone group are called ketoses. In nature, mainly pentose and hexoses are found. Pentoses. in nature, it is mainly composed of polysaccharide pentoses as a compound as well as plant and tree glue. Pentoses are abundant in wood (10-15%), hay and seed coat. Pentoses are involved in all the reactions that are unique to monosaccharides. However, pentoses differ from hexoses in that they are more resistant to microorganisms. Another characteristic reaction for pentoses is that they are converted to furfural by mineral acids. L-arabinose is the most important representative of pentoses. L-arabinose is a gummirabic or cherry glue and is obtained by hydrolysis in the presence of acids. It has a sweet taste and melts at 160 ° C. Like all monosaccharides, L-arabinose is in equilibrium in solution in two forms - open and cyclic. Tautomerism in aqueous solutions of monosaccharides. It is known that glucose exists in two different tautomeric forms: open-chain aldehyde (oxo) and closed-chain cyclic (s-oxide). In solution, these two forms are in equilibrium. The cyclic shape of the monosaccharide structure consists of six or five rings. Glucose has a hydropyran ring. Therefore, the six-membered monosaccharides are called pyranoses, and the glucose expressed by formula I is called glucopyranose. The monosaccharide molecule, which consists of a five-membered cyclic ring, is called furanose because it has a tetrahydrofuran ring, and the glucose with structure II is called glucofuranose. Fructose, which consists of a five-membered cyclic ring, is called fructofuranose. The

ISSN 2792-1883 (online), Published in Volume: 9 for the month of September-2021

five-membered ring of fructose and the six-membered ring of glucose are more stable than in the solid state. The five-membered ring of glucose is unstable and cannot be separated freely. The α- or β-isomers of the glucoside hydroxyl, which is part of cyclic pyranoses, are obtained depending on their location in space. The presence of such forms in monosaccharides can be seen in the example of glucose. Occurrence and methods of obtaining monosaccharides in nature. Carbohydrates are common in the living organism in pure form and especially in the form of glycosides with alcohols, phenols and other organic substances. They are formed from carbon dioxide in plants under the influence of solar energy and in the presence of chlorophyll pigment, a reaction called photosynthesis. Monosaccharides are obtained by the following methods:

1. In industry, glucose is obtained mainly by hydrolysis of potato or barley starch in the presence of mineral acids.
2. Sugary substances were first synthesized by A. M. Butlerov in 1861 from ant aldehyde. This reaction goes through several stages. Initially, two molecules of ant aldehyde condense in the presence of calcium hydroxide to form glycol aldehyde.
3. Polyhydric alcohols are also slowly oxidized. For example, glucose can be obtained by oxidizing six-atom alcohol. (milk sugar) are examples of disaccharides.

When disaccharides are hydrolyzed, the same or two different monosaccharide molecules can be formed. For example, sucrose hydrolyzes to form D-glucose and D-fructose, and maltose hydrolyzes to form two D-glucose molecules. In the formation of disaccharides, the first monosaccharide is always involved with its semi-acetal hydroxyl, and the second monosaccharide molecule is always involved with the semi-acetal hydroxyl or the remaining hydroxyls. The disaccharides formed by the presence of two-molecule monosaccharides in the presence of semi-acetal hydroxides are disaccharides belonging to the glucoside-glucoside (trehalose) group, and there is no grouping in their molecules that can be easily transferred to the carbonyl group. Such disaccharides are not reversible, ie they do not react with aldehydes. They do not form oxides and hydrazones. This is why such disaccharides are called irreversible disaccharides. Examples of such disaccharides are sucrose and trehalose. If a semi-acetal hydroxyl of one molecule of monosaccharide and an alcoholic hydroxyl of another molecule of monosaccharide are involved in the formation of a disaccharide molecule, such saccharides are called reducing (or glucoside-glucose) disaccharides. They easily return the Feling fluid and form phenylhydrazine and oxides. This means that they have a grouping in their molecule that can be easily converted to an aldehyde.

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ISSN 2792-1883 (online), Published in Volume: 9 for the month of September-2021