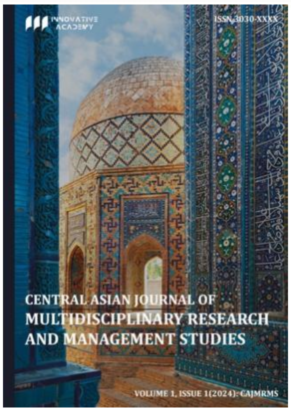

CHARACTERISTICS OF ORGANIC COMPOUNDS AND THEORY OF STRUCTURE.

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ABSTRACT

This article provides a comprehensive overview of the classification of organic compounds and their structural theories, which are one of the basic concepts of organic chemistry. Correct classification of organic compounds is an important factor for their study, understanding of reaction mechanisms, and synthesizing new substances. The article examines the criteria for classifying compounds based on the carbon skeleton, functional groups, degree of saturation, and chain shape in the molecule. It also analyzes the stages of formation of structural theories, their scientific development, and practical significance.

Introduction: Russian scientist A.M. Butlerov, in his theory called the theory of the chemical structure of organic compounds, showed that the properties of organic compounds are influenced by the composition and chemical structure of the compound. A.M. Butlerov defined the nature of an organic compound as follows (1861) (The chemical nature of a compound particle depends on the nature, quantity and chemical structure of the particles of the elements that make up its composition.)

The main idea of this definition is the chemical structure of a substance, which focuses on the order in which the atoms in the molecule are bonded to each other. Although the type and number of atoms in the molecule are the same, but they are bonded to each other in a different order, their properties are also different. As is known, such substances are called isomers. Regardless of how the atoms in the substance are bonded to each other, they interact with each other, due to which the properties of the substance are formed, and this distinguishes it from a simple mechanical mixture of atoms. A.M. Butlerov's definition does not take into account the influence of its electronic and spatial structure and other factors on the properties of an organic compound.

Organic chemistry is a broad and comprehensive scientific field that studies the compounds formed by the carbon atom with other elements. One of the aspects of this field that attracts special attention is the diversity of organic compounds and their structure, which is associated with their physical, chemical, and biological properties. A correct understanding of the specific properties of organic compounds and their division into classes is considered one of the foundations of modern chemistry. Organic compounds are obtained from natural and artificial sources and are of immense importance in life processes, industrial technologies, pharmaceuticals, agriculture, the food industry, polymer chemistry, bioorganic chemistry, and many other areas. For example, a simple organic compound - ethanol - is widely used as a biofuel, antiseptic, and solvent. Also, many pharmaceuticals (e.g. aspirin, paracetamol), plastics (polyethylene, polyvinyl chloride), dyes, and even hormones in the human body are organic.

To study this diversity on a scientific basis, it is first necessary to classify organic compounds. Through classification, the common and specific structural elements of each compound are determined, which makes it possible to predict their behavior in chemical reactions. Saturated and unsaturated, cyclic and acyclic, aromatic and heterocyclic compounds - each of these is a separate class and has its own unique properties. However, in order to correctly understand these classes, it is necessary to pay attention not only to the external structure, but also to the internal electronic structure of the molecule, the position and shape of interatomic bonds, the state of hybridization, and even resonance effects.

These aspects form the basis of the theory of the structure of organic compounds. The benzene ring model, the theory of hybridization orbitals, the concept of resonance, and other approaches proposed by Kekulé in the 19th century have strengthened the theoretical basis of modern organic chemistry. Therefore, this article will deeply analyze the correct classification of organic compounds, their structural theories, structure-property relationships, and how this knowledge is applied in practical areas. The goal is to provide readers and researchers with a scientifically sound explanation of the complex nature of organic molecules and to present modern chemical knowledge in a systematic manner.

Conclusion:

Organic chemistry is one of the most important and rapidly developing branches of modern science, and a deep understanding of the structure of organic compounds, which is its main object of research, is of particular theoretical and practical importance. As discussed in this article, the classification of organic compounds is based on their carbon skeleton, functional groups, chain shape, and degree of saturation. Such a classification serves to study organic substances in a systematic way, predict chemical reactions, and facilitate the synthesis of new substances.

Classification of organic compounds - Organic compounds are classified according to several main criteria, depending on their composition, structure, and functional groups.

1. According to the carbon skeleton.

-Acyclic (open-chain): methane, ethane, ethene, ethyne.

-Cyclic: cyclopropane, cyclohexane, benzene.

2. According to the degree of saturation.

-Saturated - only with sigma bonds, alkanes.

-Unsaturated - with double or triple bonds: alkene and alkynes.

-Aromatic - ring with a resonance structure, benzene.

3. According to functional groups.

-Alcohols: ethanol.

-Aldehydes: formaldehyde.

-Ketones: acetone.

-Carboxylic acids: acetic acid.

Practical significance of structural theories - Organic structural theories are used in pharmaceuticals, polymer chemistry, biochemistry, and other fields. Hybridization and resonance approaches are important in analyzing the structure of drugs (e.g., aspirin), synthetic materials (polyethylene), and proteins.

The physical and chemical properties of an organic compound depend on its composition and chemical, spatial, and electronic structure. The properties of alcohols, carboxylic acids, and even hydrocarbons change in strongly alkaline or strongly acidic environments. Saturated hydrocarbons undergo electrophilic substitution reactions. Water, alcohols, and other compounds in the sub- and supercritical state change their density, dielectric constant, ionic density, hydrogen bonds, and solubility over a wide range depending on temperature and pressure. The nature of an organic compound depends on its composition, chemical, spatial, and electronic structure, environment, and conditions.

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