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ORGANIC MATTER AND THEIR STRUCTURE

Arzikulova Mexri Turobovna
Tashkent State Economic University academic Lyceum
Senior lecturer of the Department" General Education Sciences"

ANNOTATION

In ancient times, when the separation of Sciences was not yet clear, scientists divided all natural substances into two large groups: inanimate and living. Substances belonging to the first group began to be called mineral. The last category included plants and animals. The second group consisted of organic matter.

Keywords: organic substances, substances that are part of carbon, carbonic acid, cyanides, carbonates, carbon oxides

INTRODUCTION

Currently, the class of organic substances has been found to be the most common among other chemical compounds. What do chemical scientists call organic matter? Answer: these are substances that are part of carbon. However, there are exceptions to this rule: carbonic acid, cyanides, carbonates, carbon oxides are not part of organic compounds.

Carbon is a very interesting chemical element of this type. Its peculiarity is that it can form a chain from its atoms. This connection turns out to be very stable. In organic compounds, carbon exhibits high valence (IV). It's about the ability to bind to other substances. These bonds can be not only one, but also two or three times. As the number of bonds increases, the chain of atoms contracts, which increases the stability of the bond.

Carbon is also known for forming linear, flat and even three-dimensional structures. These properties of this chemical element led to such a variety of organic substances in nature. Organic compounds make up about a third of the total mass of each cell in the human body. These are proteins whose body is built mainly. These are carbohydrates-a universal "fuel «for the body. These are fats that accumulate energy. Hormones control the work of all organs and even affect behavior. And enzymes begin strong chemical reactions in the body. In addition, the "source code" of a living being is a DNA strand - an organic compound based on carbon.

Almost all chemical elements are capable of forming organic compounds when combined with carbon. Often in nature, organic substances include:

* oxygen;
* hydrogen;
* sulfur;
* nitrogen;
* phosphorus.

The development of theory in the study of organic substances immediately proceeded in two interrelated directions: scientists studied the spatial arrangement of molecules of compounds and determined the essence of chemical bonds in compounds. At the origin of the theory of the structure of organic matter, the Russian chemist A.M. Butlerav.

In the field of science known as organic chemistry, the classification of substances is of particular importance. The difficulty lies in the fact that millions of chemical compounds must be characterized.

The requirements for the nomenclature are very strict: it must be suitable for systemic and international use. Experts from any country should understand what kind of compound we are talking about and express its structure one by one. A number of works are being carried out to make the classification of organic compounds suitable for computer work.

Modern classification is based on the structure of the carbon skeleton of the molecule and the presence of functional groups in it.

According to the structure of the carbon skeleton, organic matter is divided into groups:

• acyclic (aliphatic);

* garbatsiklik;

* heteracyclic.

The ancestors of any compounds in organic chemistry are hydrocarbons consisting only of carbon and hydrogen atoms. Typically, molecules of organic matter are called functional groups. These are groups of atoms or atoms that determine what the chemical properties of a compound will be. Such groups also allow you to give a combination to a particular class.

Functional groups include:

* carbonyl;

* carboxyl;

* hydroxyl.

Compounds that contain only one functional group are called monophonic. If there are several such groups in the molecule of organic matter, they are considered multifunctional (for example, glycerol or chloroform). Compounds that are different in the structure of functional groups are heterofunctional. At the same time, they can belong to different classes. Example: lactic acid. It can be considered alcohol and carboxylic acid.

The transition from class to class is carried out, as a rule, with the participation of functional groups, but without changing the carbon skeleton.

In relation to the molecule, the skeleton is the sequence of Union of atoms. The skeleton can be carbon or contain substances called heteroatoms (such as nitrogen, sulfur, oxygen, etc.). Also, the skeleton of an or ganic compound molecule can be branched or branched; open or cyclic.

Aromatic compounds are a special type of cyclic compounds: they are not characterized by addition reactions.

The following organic substances of biological origin are known:

* carbohydrates;

* proteins;

* lipids;

* nucleic acids.

A detailed classification of organic compounds includes substances of no biological origin.

There are classes of organic substances in which carbon is combined with other substances (except hydrogen:

* alcohol and phenols;

• carbonic acids;

• aldehydes and acids;
* esters;
* carbohydrates;
* lipids;
* amino acids;
* nucleic acids;
* proteins.

Structure of organic matter

The variety of organic compounds in nature is explained by the properties of carbon atoms. They are able to combine into groups - chains and create very strong bonds. As a result, there are much more stable molecules. The method of use of molecules in chaining is the main structural feature. Carbon is able to combine both in open chains and in closed ones (they are called cyclic).

The structure of substances directly affects their properties. Structural features allow tens and hundreds of independent carbon compounds to exist.

Properties such as homology and isomerism play an important role in maintaining the diversity of organic matter.

We are talking about substances that are the same at first glance: their composition does not differ from each other, the molecular formula is the same. But the structure of compounds is fundamentally different. The chemical properties of substances also vary. For example, the spelling of butane and isobutan isomers is the same. The atoms in the molecules of these two substances are arranged in a different order. In one case they are ramified, in the other they are not.

Homology is understood as a characteristic of the carbon chain, where each subsequent member can be obtained by adding the same group to the previous one. In other words, each of the homologous rows can be fully expressed in the same formula. Knowing this formula, you can easily find out the composition of any member of the series.

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