NUTRITION OF MICROORGANISMS

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Annotation: Most of them are contained as impurities in macronutrient salts or can enter nutrient media from glassware, water or air. All of these elements form organic and inorganic substances that make up the microbial cell.

Key words: molybdenum, zinc, copper, cobalt, nickel, chlorine, bromine.

For the growth and reproduction of microorganisms, and therefore for their nutrition, various chemical compounds dissolved in water are required. Based on their quantitative contribution to cell construction, macro- and microelements are distinguished. Macroelements include 10 elements of the periodic table: carbon, hydrogen, oxygen, nitrogen, sulfur, potassium, calcium, phosphorus, magnesium, iron. Microelements are needed by microorganisms in very small (trace) quantities.

They are represented by manganese, molybdenum, zinc, copper, cobalt, nickel, chlorine, bromine and some other metals and non-metals. Most of them are contained as impurities in macronutrient salts or can enter nutrient media from glassware, water or air. All of these elements form organic and inorganic substances that make up the microbial cell.

Like other organisms, microorganisms are composed of water, proteins, lipids, nucleic acids, carbohydrates and minerals. Water accounts for up to 85% of the weight of microorganisms. It serves as the medium in which all chemical reactions occurring in the cell take place. Lack of water leads to metabolic disorders in the cell, and then to its death.

Proteins are the most important component of the organic substances contained in the microbial cell. Proteins account for 50% or more of the dry weight of microorganisms. Proteins play a decisive role in the life of the body, because without them life itself is unthinkable. There are few lipids in the bacterial cell, approximately 5% of dry weight. Some microorganisms contain much more lipids - up to 40% (for example, Mycobacterium tuberculosis). Lipids are part of the cytoplasmic membrane and its derivatives, as well as the cell wall of bacteria, for example, the outer membrane, where in addition to the lipid bilayer there are lipopolysaccharides.

Lipids can act as storage substances in the cytoplasm. Bacterial lipids are represented by phospholipids, fatty acids and glycerides. Their total number depends on the type and age of microorganisms. In the cells of microorganisms,

lipids can be associated with carbohydrates and proteins, forming a complex complex that determines the toxic properties of microorganisms. Bacteria contain up to 30% of the cell's dry matter, and fungi contain much more carbohydrates – up to 60%. Carbohydrates are used to build cell walls, are part of teichoic acids, characteristic of gram-positive bacteria, and are the energy material of the cell. Some bacteria may have cytoplasmic inclusions, such as glycogen, starch, granulose, etc., which play the role of storage substances in the cell.

The content of nucleic acids in a bacterial cell depends on the type of bacteria, nutrient medium and ranges from 10–30% of dry matter. Nucleic acids of bacteria perform functions similar to nucleic acids of eukaryotic cells: DNA molecules in the form of chromosomes and plasmids are responsible for heredity, ribonucleic acids (matrix, transport and ribosomal) are involved in the biosynthesis of proteins.

Mineral substances - phosphorus, sodium, potassium, magnesium, sulfur, iron, chlorine and others - on average account for 2-14% of dry matter. Mineral substances play an important role in the life of a microbial cell: the value of osmotic pressure inside the cell, the state of the cytoplasm and the course of many biochemical reactions depend on them. A lack of any mineral element in the nutrient medium leads to metabolic disorders in the microbial cell, it stops developing and dies.

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