ethanol. We conclude that corn ethanol NEV is positive when fertilizers are produced using modern plant treatment, corn is converted into modern ethanol plants, and farmers achieve average yield of corn. Corn ethanol is energy efficient, as indicated by an energy factor of 1.34; that is, for each Btu devoted to ethanol production, there is a 34 percent increase in energy. In addition, the production of ethanol from its own corn reserves achieves a net increase in the more desirable form of energy, which helps reduce its dependence on imported oil. For the production of ethanol, a large amount of domestic energy raw materials, such as coal and natural gas, is used to process corn into high-grade liquid fuel. Only about 17 percent of the energy used to produce ethanol is liquid fuels, such as gasoline and diesel. For every 1 Btu of liquid fuel used to produce ethanol, there is 6.3 Increase in Btu. Looking at past NEV research, it turns out that the energy needs for ethanol halon production are declining over time. One of the main factors in this increase in energy efficiency is the increase in corn yield.

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WAYS OF MODIFICATION OF ANTIBIOTICS TO OVERCOME RESISTANCE (ШЛЯХИ МОДИФІКАЦІЇ АНТИБІОТИКІВ ДЛЯ ПОДОЛАННЯ РЕЗИСТЕНТНОСТІ)

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В статті наведені основні механізми розвитку та розповсюдження антибіотикорезистентності мікроорганізмів до часто використовуваних

антибактеріальних засобів. Висвітлено актуальність проблеми стійкості мікроорганізмів до антибіотиків і необхідність комплексного підходу до вирішення проблеми антибіотикорезистентності, що включає обов'язковий систематичний моніторинг стану стійкості мікроорганізмів до антибіотиків.

***Ключові слова**: резистентність, антибіотикорезистентність, мікроогранізми, антибіотики.*

The article represents the main mechanisms of development and spread of antibiotic resistance of microorganisms to frequently used antibacterial agents. The urgency of the problem of microorganisms' resistance to antibiotics and the need for a comprehensive approach to solving the problem of antibiotic resistance, which includes mandatory systematic monitoring of the state of resistance of microorganisms to antibiotics, are displayed.

***Key words:** resistance, antibiotic resistance, microorganisms, antibiotics.*

Formulation of the problem. Antibiotic resistance of the main pathogens of infectious diseases is one of the biggest problems of modern medicine.

The rate at which the resistance of microorganisms to antibacterial drugs (ABP) is formed and spread is impressive. Drugs that were effective a few years ago are now losing their position and their use is forced to be limited. According to the World Health Organization, the rapid increase in the resistance of microorganisms to antibacterial drugs threatens to undermine the foundations of health care developed by medical science over the past 50 years.

Analysis of recent research. There are currently two ways out of this situation: to intensify the development and implementation of new antibacterial drugs or to find methods to control the spread of resistance of microorganisms to drugs that already exist and are used [1].

The first scenario is long-term and extremely cost-effective. It can take years, sometimes decades, from the development of a new antibacterial molecule to the release of a finished drug.

The second option is no less difficult than the first, but it allows you to take action today, which is extremely relevant.

In fact, the greatest success can be achieved only in the case of parallel development of both processes: the development and implementation of new antibacterial drugs and the use of programs to strengthen control over the level of resistance of microorganisms to existing drugs [2].

It is known that the levels of resistance of different microorganisms to different antibacterial drugs vary depending on the region. Therefore, first of all, it is extremely important to adequately assess the state of antibiotic resistance of the main pathogens to widely used antibacterial drugs. Unfortunately, in Ukraine today there is no relevant, objective, systematic data on the state of antibiotic resistance of microorganisms [3].

Setting objectives. Finding and developing new antibiotics is a long, painstaking and expensive process. In the course of such studies, hundreds or even thousands of cultures of microorganisms are studied and rejected. At the same time, all new pathogens of infectious diseases are detected, and the spectrum of activity of existing drugs becomes insufficient to combat them. Bacterial resistance is growing rapidly. Therefore, along with the search for natural antibiotics, work is underway to study the structure of existing substances, in order to modify them, to obtain new and new, more effective and safer drugs. Thus, the next step in obtaining antibiotics was the creation of semi-synthetic substances that are similar in structure and action with natural antibiotics [4].

Theoretical substantiation of the conducted researches. Along with the development of traditional methods of creating new antibiotics (search for microorganisms-producers, modifications of natural antibiotics), the methods of genetic engineering and modern biotechnology occupy an increasing place in solving this problem. For example, antibacterial substances can be obtained by inserting the genes of the "right" antibiotic into the genome of bacteria – in the process of life, such bacteria develop the desired drug substance, turning into a kind of pharmaceutical factory for the production of antibiotics. Therefore, the process of creating new antimicrobial agents requires close cooperation of highly qualified specialists in many fields: pharmaceutical technologies, biotechnology, genetics, bioorganic chemistry, experimental and clinical chemotherapy, and others.

Resistance of microorganisms to antibacterial drugs can be natural and acquired.

Natural resistance is a constant feature of microorganisms, it is known, easily predicted and remains unchanged over time. Naturally resistant microorganisms either do not have a target for antibiotic action, or their membrane is impermeable, or the antibiotic is enzymatically inactivated, microorganisms that have a natural resistance to certain antibacterial drugs, a priori not sensitive to them.

Acquired resistance of microorganisms is a big problem and it is difficult to predict. The main feature of acquired resistance is its change over time. The emergence of acquired resistance is possible in two ways: mutations in the own genes of microorganisms and obtaining from the outside of the genetic material responsible for resistance [5].

The main source of genetic information in a bacterial cell is the chromosome, which in most cases is formed by a single closed circulating DNA molecule. The genes contained in it ensure the viability of the bacterium in almost any circumstance.

At the same time, many (possibly all) bacteria have additional DNA molecules called plasmids. They are smaller in size than chromosomal DNA, unrelated to it and usually reproduced separately from it.

Genes carried by plasmids are often not vital for bacterial survival under normal conditions, but may give host cells an advantage in the struggle for existence in some special circumstances.

The third source of genetic information in a bacterial cell is bacteriophages (or simply phages). Bacteriophages are viruses that infect bacteria [6].

The presence of these mechanisms of genetic information transmission means that not only mutations and selection determine the evolution of bacteria. For example, a previously antibiotic-sensitive bacterium may acquire a plasmid during conjugation that contains genes encoding resistance to several different antibiotics. As a result, a pool of polyresistant microorganisms can be formed in a short period of time in this ecological sphere.

The most important of these mechanisms is the destruction of the antibiotic by bacterial cells (microorganisms are able to secrete enzymes that destroy the antibiotic). Example of this is the development of resistance to β-lactam antibiotics are widely used in clinical practice.

Bacterial cells can also secrete enzymes that modify the antibiotic. As a result, the antibiotic loses the ability to bind to its targets in the bacterial cell and loses its effectiveness. An example is the development of aminoglycoside resistance in gram-negative bacteria of the family *Enterobacteriaceae*, when antibiotics are inactivated by acetylation, adenylation or phosphorylation [3, 4].

Resistance can develop when the target for an antibiotic change. An example of this type of resistance is the resistance of *S. pneumoniae* to penicillin.

Resistance can develop when the permeability of bacteria to antibiotics is impaired. For example, β-lactam antibiotics penetrate into gram-negative bacteria through the pores by diffusion. Reducing the number or radius of pores leads to a decrease in the sensitivity of bacteria to these antibiotics [6].

The described mechanisms do not exhaust the topic of acquisition and transmission of antibiotic resistance. They give only a brief idea of the ability of the microbial world to adapt to new environmental conditions and, above all, to the use of antibiotics.

Recommendations for the use of antibacterial therapy for various infections are based on the results of microbiological studies. Such studies make it possible to monitor the sensitivity of antibiotics to key pathogens, to monitor the dynamics of changes in sensitivity, to make adjustments to treatment standards [4].

Conclusions and prospects for further research. Today, the scientific community unanimously agrees that restricting the use of antibacterial drugs as the only way to control and reduce resistance is ineffective.

Thus, the problem of resistance of infectious agents to antimicrobials is multifaceted and difficult to solve. The causes of the rapid spread of resistance of microorganisms are currently not

fully understood. The phenomenon of bacterial resistance requires the development and implementation of new and effective drugs. Therefore, the search for new antibiotics, and especially the modification of known ones to improve them, is one of the main directions of modern medicine, and the introduction of new antibiotics in medical practice in the coming decades should become one of the priorities of domestic science and technology.

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AGRICULTURAL ENTERPRISES OF THE SOUTH OF UKRAINE (СІЛЬСЬКОГОСПОДАРСЬКІ ПІДПРИЄМСТВА ПІВДНЯ УКРАЇНИ)

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Ця стаття про сільськогосподарські підприємства півдня України. В ній описуються історія, стан, продукція підприємства, а також послуги які вони представляють фермерам.

Ключові слова: *дилер, підприємство, дистрибуція, підрозділ, сільське господарство, продукція.*

This article is about agricultural enterprises in the south of Ukraine. It describes the history, condition, products of the enterprises, as well as the services they provide to farmers.

Key words: *dealer, enterprise, distribution, unit, agriculture, products.*