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ФИТОБИОТИКИ КАК АЛЬТЕРНАТИВА КОРМОВЫМ АНТИБИОТИКАМ В ЖИВОТНОВОДСТВЕ

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PHYTOBIOTICS AS AN ALTERNATIVE TO FEED ANTIBIOTICS IN ANIMAL HUSBANDRY

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В статье приведен анализ литературы по применению фитохимических веществ в животноводстве. Установлено, что оптимальные комбинации различных альтернатив антибиотикам в сочетании с надлежащими методами управления в животноводстве будут ключом к максимальному увеличению производительности и поддержанию продуктивности животных, шагом к конечной цели – сокращению использования антибиотиков в животноводстве.

Human activity leads not only to the emergence of new resistant species and strains of microorganisms, but is also one of the main vectors of their spread. Thus, an increase in livestock and a high concentration of animals per unit area led to severe economic consequences in the event of infectious diseases. A solution was found, and in the late 50s of the twentieth century, feed antibiotics began to be used in the United States. This experience was adopted in Europe and the USSR.

As a result, there was a decrease in morbidity and mortality among animals, and an increase in live weight. But already 30 years later, it turned out that feed antibiotics are one of the reasons for the emergence of new resistant strains, which ultimately led to an increase in human mortality from infectious pathologies.

The second factor aggravating the situation is the use of antibacterial drugs in violation of the rules of antibiotic therapy. The globalization of many processes that has affected agriculture, food production, trade in breeding animals and animal raw materials should not be discounted.

Today, no one is surprised by beef from Latin America, fruits from Africa, aquaculture products from Southeast Asia. As a result, not only various types of bacteria and fungi move along with the products of the agro-industrial complex, but the spread of antibiotic resistance genes occurs.

The EU countries began to fight against the formation of antibiotic resistance by microorganisms and its spread back in 1998, when they abandoned the use of bacitracin, spiramycin, virginiamycin and tilazin. Since January 1, 2006, feed antibiotics have been banned in the EU countries. Thus, there was a sharp reduction in the volume of their use by farmers.

In recent years, there has been a significant increase in the number of scientific articles on alternatives to antibiotics and feed additives that promote growth and intestinal health in animals, as well as reduce the use of antibiotics in animal production [1, 7, 8, 9]. The classes of alternative antibiotics that are available to improve animal performance and help farm animals achieve their genetic potential in current

commercial settings include probiotics, organic acids, phytogenics, prebiotics, synbiotics, enzymes, antimicrobial peptides, and bacteriophages. Although the beneficial effects of many developed alternatives have been well described, information on their mechanism of action, their effectiveness in practice is lacking. In addition, the effectiveness varies depending on the place of growth.

Intensification of livestock production based on the use of feed antibiotics has raised concerns that this leads to the development of antimicrobial resistance and poses a potential threat to human health. There are still mixed opinions about the transfer of antibiotic resistance genes from animal pathogens to human ones. However, studies have shown "a potential association between the practice of using subtherapeutic doses of antibiotics and the development of antimicrobial resistance among the microbiota" [2, p. 44].

Due to tightening regulations regarding the use of growth promoters and increasing consumer demand for antibiotic-free livestock products, the search for alternatives to antibiotics has intensified in recent years. Ideal alternatives to antibiotics should have the same positive effects as antibiotics. They should provide optimal animal productivity and increase the availability of nutrients, have a positive effect on feed conversion and growth [6].

Many scientists and practitioners working in the field of animal nutrition have turned their attention to phytochemicals, also called phytobiotics or phytogenic substances. They are natural bioactive compounds derived from plants and included in animal feed to increase productivity [2, 8]. Phytochemicals can be used in solid, dried and ground form or as extracts, as well as essential oils and oleoresins. Polyphenols are the main biologically active compounds of phytochemicals. Their composition and concentration depend on many factors such as the parts of the plant, geographic origin, harvest season, environmental factors, storage conditions and processing methods. The potential benefits of herbal extracts may differ due to the wide variation in composition. This diversity encourages the scientists and practitioners to choose the best feed additives to evaluate their possible role as an alternative to antibiotics in animal production.

In recent years, phytochemicals have been used as natural growth promoters in ruminants, pigs and poultry. A wide range of herbs and spices such as "thyme, oregano, rosemary, marjoram, yarrow, garlic, ginger, green tea, black cumin, coriander and cinnamon are used in the poultry industry as an alternative to antibiotics" [5, p. 3]. Various results have been reported with the use of essential oils in poultry diets, some of which included cinnamaldehyde [4] and a mixture of thymol and cinnamaldehyde improved body weight gain in broilers, while others such as thymol and star anise essential oil, improved feed absorption. Turmeric alone or turmeric with pepper [3] increase resistance to intestinal diseases such as coccidiosis and necrotizing enteritis.

The value of phytobiotics as one of the components of diets for farm animals and birds lies in their multidirectional effect on the animal body such as immunomodulatory, anti-inflammatory, antioxidant. They are able to normalize the functioning of intestinal enzyme systems, and due to the presence of essential oils, they give a pleasant aroma to the feed mixture, thereby increasing feed intake, which in turn leads to better absorption of dietary nutrients and increased productivity of animals.

However, the most important property of phytobiotics is their effect on microorganisms. The antibacterial, antifungal and antiviral effects of plant secondary metabolites have been identified, although in agriculture the main focus is on the bactericidal and bacteriostatic effects of phytobiotics [10].

Thus, optimal combinations of different alternatives, combined with good livestock management practices, will be the key to maximizing productivity and maintaining animal productivity as we move forward towards the ultimate goal of reducing the use of antibiotics in animal production.

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ВЕРТИКАЛЬНОЕ ОЗЕЛЕНЕНИЕ КАК СПОСОБ ПОВЫШЕНИЯ КОМФОРТНОСТИ ИНТЕРЬЕРА

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VERTICAL LANDSCAPING AS A WAY TO INCREASE THE COMFORT OF THE INTERIOR

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В статье рассматриваются варианты вертикального озеленения в интерьере, его преимущества и недостатки. Вертикальное озеленение, как новое ландшафтное изобретение, в условиях интерьера выполняет санитарно-гигиенические и эстетические функции. Оно может использоваться не только с точки зрения красоты и эстетики, для маскировки каких-либо недочетов в интерьере, но и для улучшения параметров микроклимата помещения, оказывая тем самым благоприятное влияние на здоровье человека.

The problem of the modern world is the lack of green spaces, the deterioration of air quality. In the age of modern technology, more emphasis is being placed on infrastructure development, the density of buildings is increasing and this leads to a decrease in green spaces, and, consequently, to a deterioration in air quality. At the moment, a person spends most of his time in a room with dry air, poor microclimate, which is not the best way to affect his health and performance. Vertical landscaping indoors can be an excellent solution.

The advantages of vertical gardening are the possibility of its use in small rooms, ease of maintenance (due to automatic watering), the ability to adjust and improve the appearance of the interior, strengthen noise insulation [1;2].