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м. ЖИТОМИР

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В збірнику висвітлені результати вітчизняних і закордонних наукових досліджень з актуальних питань бджільництва та апітерапії, які становлять інтерес для науковців, освітян і широкого кола практикуючих спеціалістів.

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COMPREHENSIVE APPROACHES TO PRESERVING HUMAN AND ANIMAL HEALTH USING BEEKEEPING PRODUCTS WITHIN THE FRAMEWORK OF THE ONE HEALTH CONCEPT

Ligomina I. P. – PhD in Veterinary Sciences, Associate Professor
Polissia National University, Zhytomyr
Solovyova L. M. – PhD in Veterinary Sciences, Associate Professor
Bila Tserkva National Agrarian University
Lisogurska D. V. – PhD in Agricultural Sciences, Associate Professor
Furman S. V. – PhD in Veterinary Sciences, Associate Professor
Lisogurska O. V. – PhD in Agricultural Sciences, Associate Professor
Polissia National University, Zhytomyr

Introduction. Human and animal health is considered in conjunction with environmental protection, quality control of food resources and the use of natural biologically active products. The One Health concept involves the integration of human medicine, veterinary medicine and ecology into a single system for disease prevention and health maintenance. Bee products, including honey, propolis, bee pollen, pollen and royal jelly, have been used for centuries in both human and veterinary nutrition. They contain a wide range of biologically active components - amino acids, vitamins, minerals, antioxidants and enzymes, which affect various physiological processes in the body.

Modern studies show that the systematic use of bee products helps to increase immunity, normalize metabolism, reduce the risk of infectious and chronic diseases. For livestock, these products are promising natural feed additives that increase the vitality and productivity of animals, reducing the use of synthetic drugs and antibiot-

ics. In the context of modern global problems with human and animal health, the inclusion of bee products in the diet becomes strategically important. They can play the role of natural biostimulants, antioxidants and immunomodulators are an integral part of an integrated approach to maintaining health.

The aim of this work is to review the literature on the use of beekeeping products to support human and animal health, assess their potential in preventive and health strategies, and determine their role in integrating the One Health concept.

Materials and methods. Particular attention was paid to studies on the effects of propolis, pollen, and royal jelly on bee colonies, their resistance to pathogens, including Varroa destructor and Nosema spp. The effect of beekeeping products on the physiological state of domestic animals, including pigs, cattle, and poultry, was also assessed.

Research results. Honey is a source of simple sugars (glucose and fructose), organic acids (citric, malic, lactic), enzymes (glucose oxidase, catalase), and minerals (calcium, magnesium, potassium, iron). Regular consumption of honey helps to increase energy metabolism, normalize the digestive system, stimulates intestinal peristalsis and maintains a healthy microbiocenosis. Thus, studies have shown that daily consumption of 20–30 g of honey for 4 weeks improves the intestinal microflora, increases the activity of lactobacteria and reduces the growth of pathogenic microorganisms. Propolis contains phenolic compounds, flavonoids, terpenes and amino acids, which exhibit pronounced antioxidant, anti-inflammatory and antimicrobial effects. It inhibits the growth of pathogenic bacteria, fungi, stimulates the activity of macrophages, increases the production of interleukins and thereby enhances the body's immune response. Experiments on laboratory animals have shown that daily administration of propolis at a dose of 50–100 mg/kg of

body weight reduces inflammatory processes by 30–40% compared to the control group. Flower pollen and bee pollen are rich in proteins (20–35%), essential amino acids, B vitamins (B1, B2, B6, B12), beta-carotene and minerals (calcium, magnesium, iron, selenium, zinc). These components support physiological homeostasis, normalize metabolic processes, promote tissue repair and increase the body's resistance to stress. Studies have shown that introducing pollen into the diet of elderly people increases hemoglobin levels by 10–15% and improves immune status indicators, in particular the activity of T and B lymphocytes. Similar health effects are observed when using royal jelly, which contains specific proteins, peptides, fatty acids and steroid components. It has a positive effect on the nervous and endocrine systems, stimulates the growth and development of the body. In experimental studies of young rats that received royal jelly for 6 weeks, growth acceleration by 12–15%, increased protein synthesis in muscles and normalization of hormonal levels were noted, which confirms its role as a powerful natural biostimulant. Honey and propolis are actively used as feed additives to increase animal immunity, improve productivity and reduce the use of antibiotics. Thus, in pig farming, the introduction of 5% honey into the diet of piglets up to 3 months of age increased the average daily weight gain by 15% and reduced mortality by 5%. Flower pollen and perga in the feeding of young cattle contribute to an increase in hemoglobin content, improved metabolism, and increased overall activity of enzymatic systems. Experiments have shown that adding 3–5% propolis to feed for 60 days increases the milk yield of cows by 8–10%, improving the quality of milk (increasing protein and fat content).

In beekeeping, propolis and royal jelly are used to prevent infections and control pathogens. The systematic inclusion of these products in the diet of bees increases the resistance of colonies to Varroa destructor and Nose-

ma ceranae, improves the survival of bees in winter and stimulates the reproduction of queens. For example, the use of 2% propolis paste in the winter feed of bees increased the survival of colonies by 25% compared to the control group. The integration of beekeeping products into the human diet and animal nutrition corresponds to the principles of the One Health concept. The use of honey, propolis, propolis and royal jelly reduces the need for synthetic medicines, increases natural immunity and supports the health of the ecosystem by preserving pollinating bee populations.

In addition, regular use of these products in veterinary medicine and human nutrition contributes to the formation of stable immune systems, normalization of metabolic processes, and reduction of the risk of infectious, cardiovascular, and metabolic diseases. Research data confirm that a combined approach with the use of beekeeping products in different links of the food chain – from bees to humans – allows maintaining health at the level of the organism, population, and ecosystem, which is a key principle of the One Health concept.

Conclusions. Beekeeping products – honey, propolis, pollen, bee pollen, and royal jelly – are a valuable source of proteins, vitamins, minerals, and biologically active compounds that support immunity and metabolic balance.

The use of these products in veterinary medicine increases animal productivity, strengthens their immunity, and reduces the need for synthetic medications.

The integration of beekeeping products into the human and animal diet is in line with the principles of "One Health" and contributes to the preservation of pollinating bee populations. Regular use of beekeeping products in animal nutrition and feeding is a promising means of disease prevention and maintenance of general health.