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Influence Of The "Probix" Food Additive And Antibacterial Preparations On The Morphology Of Internal Organs Of Broiler Chickens.

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ABSTRACT

The aim is to study morphological changes of products of chicken-broiler slaughter when using "Probix" feed additive (FA) with probiotics and antibacterial preparations of pharmazin and tilotsiklinvet. The research was carried out on broiler chickens of the "Ross 380" cross-breed on the 42nd day in two stages. At the first stage, histological studies were performed on the internal organs of broiler chickens, which were fed with "Probix" feed additive. At the second stage of the study, the morphological changes in the internal organs of broiler chickens were studied in the case of the use of pharmazin and tilotsiklinvet. In the first phase of the research, it was found, that the use of "Probiks" FA, according to the scheme proposed by the manufacturer, in the main diet of broiler chickens, was non-harmful and showed no histological changes of the poultry internal organs. It was found that use of antibiotics of macrolide group with a therapeutic and prophylactic purpose leads to the morphological changes of internal organs. Chicken broilers, which were fed with pharmazin, had in their liver hepatocytes in a state of granular dystrophy; the nuclei were poorly stained; cytoplasm had a frothy or foamy appearance and was in an adipose infiltrative dystrophy condition, so had an annular look; nucleus were shifted to a peripheral tory cell; intercellular connective tissue was infiltrated by the cells of the lymphoid series. Epithelium was found in a state of granular dystrophy in some part of tubules of kidney, the nucleus are badly visualized, the cytoplasm is of pinkish-gray color, the space between tubules was narrowed or completely absent, connective tissue was infiltrated by the cells of the lymphoid series. In the myocardium, pathological changes were observed in the intramuscular connective tissue, the collagen fibers were loose in it, rolled apart, poorly stained, the focal lymphocytic infiltration of the intramuscular connective tissue was observed. Chicken broilers, which were fed with tilotsiklinvet, had shown the following changes in their bodies: in the liver – granular dystrophy of numerous tubules; in the myocardium – granular dystrophy of a sufficiently large number of tubules; in a myocardium – insignificant focal lymphoidocity infiltration of intramuscular connective tissue.

Keywords: poultry, probiotics, pharmazin, tilotsiklinvet, histologic changes.

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INTRODUCTION

In the European Union, since January 2006, the use of antibiotics as feed additives for livestock and poultry raising has been limited by the requirements of consumers [1]. However, in Ukraine, a number of antibiotics are used as medical and prophylactic chemicals against many animal and poultry diseases [2]. More than a half of antibiotics, including the antibiotics of the macrolide group, are used during the raising of broiler chickens for the treatment of bird, and as a result it leads to stimulation of their growth, and as a consequence, appears a problem of their accumulation in poultry products [3]. To solve the problem of prevention and treatment of poultry against the enteritis, salmonella, coccidiosis, etc., is quite difficult without antibiotics. Therefore, the search for non-harmful and effective nutraceuticals aimed at the improvement of the growth and development of broiler chickens, as well as the safety and quality of bird slaughter products, becomes important nowadays.

Necrotic enteritis, caused by *Clostridium spp*., was traditionally treated with antibiotics and simultaneously used as growth stimulants, which led to the emergence of resistant pathogenic microorganisms and the accumulation of their residues in poultry products, which poses a threat to the health of the consumer. However, scientists have developed a new scheme to fight this disease, which includes the use of probiotics and prebiotics, organic acids, essential oils, fodder enzymes, along with vaccination, the use of immunoglobulin, bacteriophages, which, simultaneously with the prevention of the disease, accelerate the growth of chicken broilers [4]. According to other studies, scientists have found that adding to the main diet of broiler chickens of probiotic and organic acids in the starting phase has a positive effect on growth rate and intestinal morphology better than the antibiotics [5].

As an alternative to antibiotics, as growth stimulators in livestock production, scientists are offering probiotics derived from *Aspergillus* awamori fungi that were used to feed chicken broilers to improve the growth and quality of meat [1]. Bacillus amiloliquefaciens is used to replace the bacitracin antibiotic in the late stage of broiler chicken breeding. It improves the digestibility of feed, intestinal microflora and growth rate [6]. *Bacillus subtilis* and *Lactobacillus acidophilus* probiotics are also used as an alternative to antibiotics, since probiotics change the intestinal microflora, which, in turn, improves the digestive efficiency and accelerates broilers' growth [7]. There were also conducted some studies to compare the influence of antibiotics and probiotics in conditions of salmonella infection on the organoleptic characteristics of poultry meat. Addition of the CloSTAT probiotic to a poultry diet has positively influenced the organoleptic characteristics of chicken breast versus the antibiotic [8]. Some scientists suggest using in the poultry industry of probiotics (*Lactobacillus casei, Bacillus subtilis, Saccharomyces cerevisiae, Aspergillus oryzae, Streptomyces griseus*) with an oxytetracycline antibiotic in a diet. The authors argue that this combination reduces the amount of antibiotic residues in a meat by 40 % [9]. The combination of the use of the probiotic *Lactobacillus acidophilus* and the *Herba Houttuyniae herb* prevents salmonellosis and increases the poultry productivity [10]. Feed additives with *Lactobacillus plantarum* and *Lactobacillus acidophilus*, unlike to bacitracin methylenedisalicylate, have improved the immunity of broiler chickens, reduced the amount of *Escherichia coli* in the intestine and may be effective substitutes for growth stimulants, which are feed antibiotics [11]. The study of the influence of the feed additive of the *Lactobacillus salivarius* probiotic strain has shown, that its use promotes the increase in the body weight of broiler chickens, reduces mortality [12]. *Bacillus subtilis* and *Lactobacillus acidophilus* were also used to develop diets for organic chickens. Studies have shown that they provide prevention of Newcastle disease, improve blood indices and Lactobacillus acidophilus immune response, as well as reduce the lipid content in eggs [13]. They also studied the influence of *Bacillus subtilis* probiotic and prebiotics (xylooligosaccharide and mannanoligosaccharide) on growth parameters, intestinal morphology, immunity and antioxidant indicators of broiler chickens, and the effect became to be positive [14]. The effectiveness of synbiotics regarding the productivity and antioxidant status of chicken broilers was established [15]. The use of *Lactobacillus plantarum* in broiler chickens production provides protection against *Salmonella typhimurium* and *Escherichia coli* [16]. Bacillus subtilis has a number of positive effects if they are used as a feed additive for broiler chickens. This probiotic supplement stabilizes the intestinal microflora by reducing *Escherichia coli*, *Salmonella, Coccidia*, contributing to the increase of beneficial microorganisms and the improvement of immunity by increasing IgA and IgG, contributing to the reduction of ammonia levels in excreta, the production of antioxidants, and increased feed digestibility. In addition, it has been found, that *Bacillus subtilis* produces xylanases with similar to those of antibiotic properties [17]. The microbial feed supplement (MFA) has reduced the level of lipid peroxidation and softened the level of oxidative stress for broiler chickens [18]. The probiotic properties of *Lactobacillus casei, Lactobacillus saniviri Cuc-1 Leuconostoc mesenteroides Com-54, Lactobacillus johnsonii F-6, Lactobacillus crispatus F-59* were studied, including resistance to gastric acidity and bile compounds, resistance to enzymes and antibiotics. It was found, that these strains had antimicrobial activies against salmonella [19].

Taking into account the fact that there is a global problem of antibiotic resistance to a number of dangerous pathogens of human and animal diseases, the use of antibiotics is limited. For Ukraine, where the use of antibiotics of macrolide group is still relevant in poultry farming, along with the information on their residual content in poultry production products, – the search for non-harmful and effective nutraceuticals, which can improve the growth and development of broiler chickens, as well as the safety and quality of poultry slaughter products, is a topical issue.

The aim is to study the morphological changes of broiler chickens slaugher products when using “Probix” feed additive with probiotics and antibacterial preparations of pharmazin and tilotsiklinvet.

MATERIALS AND METHODS

The research was carried out on broiler chickens of the "Ross 380" cross-breed on the 42nd day in two stages. At the first stage, they have conducted histological studies of internal organs of broiler chickens, which were fed with “Probix” feed additive. One experimental group and one control group (5 chickens each) were formed for the experiment. Feed additive (FA) "Probix" is a mixture of probiotics and prebiotics. The probiotic component of the premix is made up of using the specially selected original strains of lactic acid microorganisms *Lactobacillus acidophilus* (20 %), *Lactobacillus helveticus* (5 %), *Lactobacillus bulgaricus* (5 %), *Lactobacillus lactis* (5 %), *Streptococcus thermophilus* (5 %), *Enterococcus faecium* (20 %), which are isolated from natural sources, dairy products or selected by other methods, without the use of genetic modifications. The prebiotic component of the premix is made up of using the polydecrosis (10 %) and inulin (20 %). Calcium carbonate $CaCO_3$ (10 %) is used as a stabilizer.

The additive was fed at a rate of 600 g/ton of feed from the 5th to the 27th day; and 300 g/t – from the 28th to the 42rd day. Chickens in the control group received only the main diet. All the broiler chickens from both control and experimental groups had free access to a water and a feed. At the end of the study they performed an euthanasia in compliance with the generally accepted principles of bioethics.

At the second stage of the research, they studied the morphological changes in the internal organs of broiler chickens when using pharmazin and tilotsiklinvet. Four groups of broiler chickens of the daily age were formed: two control and two experimental (12 broiler chickens each). Chickens of the first experimental group were fed with pharmazin containing the active substance (AS) of tylosin tartrate of 500 mg per 1 g, and of the second − tilitsiklinvet containing the AS of tylosin tartrate and the doxycycline glicate of 100 mg/g of powder. Preparations were fed orally with a water at a dose of 1 g per 1 dm^3 of water according to the instructions for use (“HUVEPHARMA” JSC, Bulgaria; “Vetsintez” LLC, Ukraine). Antibiotic preparations were given to broiler chickens with a prophylactic purpose for the first 3 days of life, on 28−29 and 38−42 days of the experiment. At the end of the experiment, 6 broiler chickens from each group were slaughtered at the beginning of the elimination period (in 3 hours) and after the end of the withdrawal period (in 5−8 days), respectively, after the last preparations use.

For histological examination, the samples of liver, kidney and a heart were taken from carcasses of broiler chickens from both, experimental and control groups. These samples were fixed in 70 % aqueous ethanol solution, dehydrated in absolute ethanol at a concentration of 96 %, poured into paraffin. They prepared the required number of histocysts, 10 microns thick, painted with hematoxylin Caracas and eosin. All the prepared chemicals were studied using a microscope "MCXi 100 LED" manufactured by Micros (Austria). Experiments were conducted in three replies.

RESULTS

According to the results of the first stage of our research, it has been established that gepathocytes form the liver tubules. The lobular structure of the liver of chickens of the control group, which received histoparticles, is badly visualized. In the center of the tubules, the central vein is well defined; the hepatic tubes are radially oriented, which are very branched and anastomosed with each other. Between the hepatic tubes there are sinusoidal capillaries in the form of slit spaces lined with endothelium. In the liver of chickens from the control group they observed the expansion of sinusoidal capillaries and perivascular spaces; hepatocytes were of polygonal shape with a spherical nucleus, some were dual-core ones. Euchromatin prevailed in nuclei and 2−3 nucleoli were observed in. The cytoplasm is optically light and often contains numerous vacuoles that correspond to the lipid inclusions (Fig. 1 A, B).

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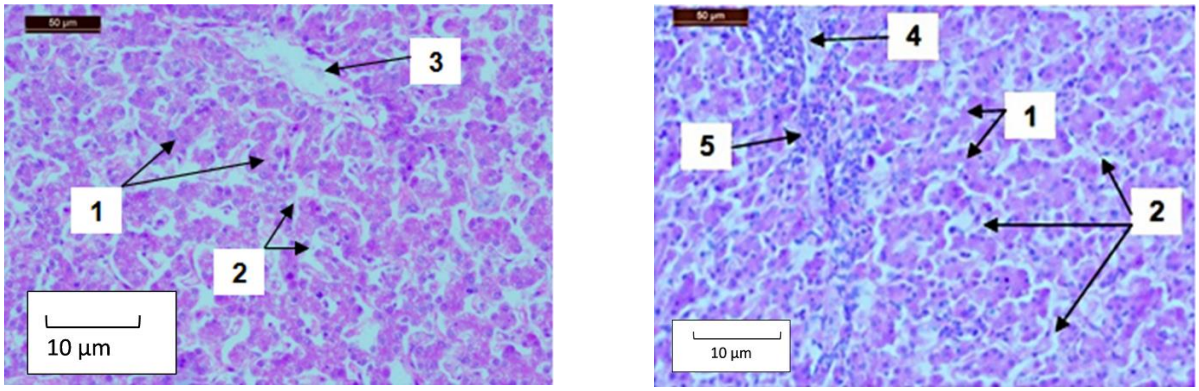


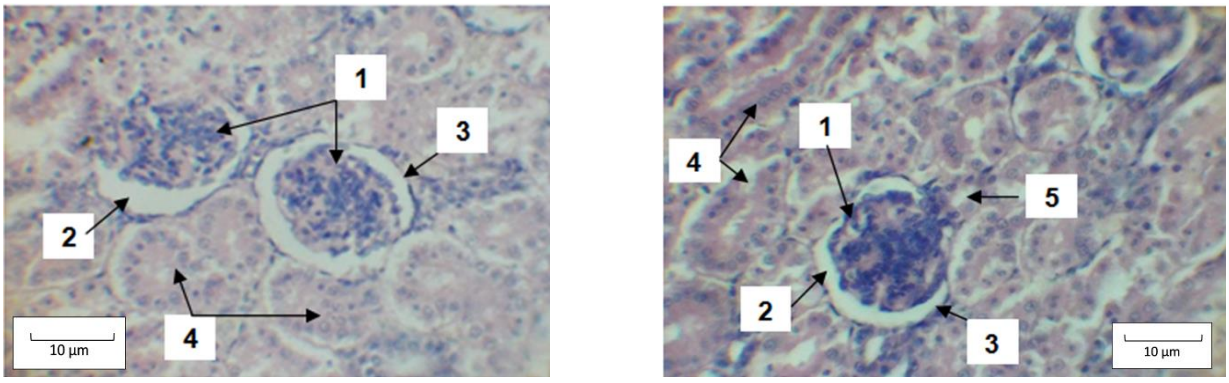
A B

Fig. 1 (A, B). Liver of broiler chickens. Histological preparation (hematoxylin and eosin): A – control group; B – research group. Indications: 1 – liver tubules, 2 – sinusoid capillaries, 3 – central vein, 4 – hepatic veins, 5 – lymphocytes in the intercellular layers of loose connective tissue.

Intercellular layers of loose connective tissue are poorly visualized, in which triads (portal spaces) are defined, which consist of interlobular arteries and veins, as well as the bile duct. Interlobular veins are moderately blood-filled, carry blood from the portal vein into lobules. The liver veins, that collect the blood from the central veins of the lobules, are placed outside the triads and also are moderately blood-filled.

The radial orientation is not clearly expressed for the chickens of the experimental group that received "Probix" feed additive. Sinusoidal capillaries have an uneven width with sections of extensions and narrowings. The intraorganic venous system is intensively blood-filled and is pretty much expanded. In a loose connective tissue of interlobular layers and portal spaces, they often observed diffused clusters of lymphocytes. In the cytoplasm of hepatocytes there are numerous fat vacuoles. They also observed cells with signs of karyopicnosis, and sinusoidal capillaries – stellate macrophages.

In those parts of chicken kidney from both, control and experimental groups, which were fed with "Probix" FA, they have determined some structural and functional areas: cortical and cerebral. In the cortical area there were located renal corpuscles and tubules of nephrons, cerebral area consists of Bellini ducts (Fig. 2 A, B).



A B

Fig. 2 (A, B). Kidneys of broiler chickens. Histological preparation (hematoxylin and eosin): A – control group; B – research group. Indications: 1 – arterial vascular glomerulus, 2 – cavity of the nephron capsule, 3 – external leaf of the nephron capsule, 4 – sections of the proximal tubules of the nephron, 5 – distal convoluted tubule of the juxtaglomerular complex.

In chickens' kindney from the control group (which received histological preparations), in the cerebral area of renal cells there were well-defined cavity and the outer layer of the capsule, and also the tubular cut sections of nephrons. Proximal and distal segments of the nephron differed in the center of cells morphologically, as well as the initial sections of prefabricated tubes and prefabricated ducts.

Interlobular veins are enlarged and blood-filled. The peritubular venous system is moderately blood-filled and weakly visualized. The brain substance contained prefabricated tubules and prefabricated ducts that formed the initial sections of the urinary tract of the kidney.

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In the chickens' kindney from the experimental group (receiving feed additive), structural and functional areas of kidney lobules were well observed. During the comparative analysis of the morphology of the renal tubule cells and nephron, structural differences were not observed, compared with the control group. The distal tubule of the juxtaglomerular complex was well observed, without any signs of enlargement.

In the cardio myocytes of the myocardium of chickens from the control and experimental groups they observed longitudinal and transverse striation, as well as the intercalated discs. Oval nuclei of cardio myocytes took central position in the cells, they had 1–2 nucleoli and moderate content of heterochromatin. Thus, in the structure of cardomyocytes of chickens from both groups there were no differences. However, chickens of experimental groups showed slightly increased thickness of layers of loose connective tissue.

Thus, adding to the main diet of broiler chickens of the "Probix" FA according to the scheme proposed by the manufacturer, did not show histostructural disorders in their internal organs.

On the basis of the results of the second stage of the study, it was found, that broiler chickens of the first experimental group (were fed with pharmazin) had the following histological changes at the beginning of the withdrawal period: there were hepatocytes in the liver in the state of granular dystrophy – were enlarged; the nuclei were poorly stained; cytoplasm had a frothy or foamy appearance and was in an adipose infiltrative dystrophy condition, so had an annular look; nucleus were shifted to a peripheral tory cell; the cytoplasm was transparent, since the fat is being washed out in process of histological preparations manufacturing. Intercellular connective tissue was infiltrated by cells of the lymphoid series (Fig. 3).

In renal glomeruli no changes were found. In some tubules the epithelium was in a state of granular dystrophy – the epitheliocytes were enlarged in size, the nuclei were badly visualized, the cytoplasm was of pinkish-gray color, the space between tubules was narrowed or completely absent. Connective tissue was infiltrated with cells of the lymphoid series (Fig. 4).

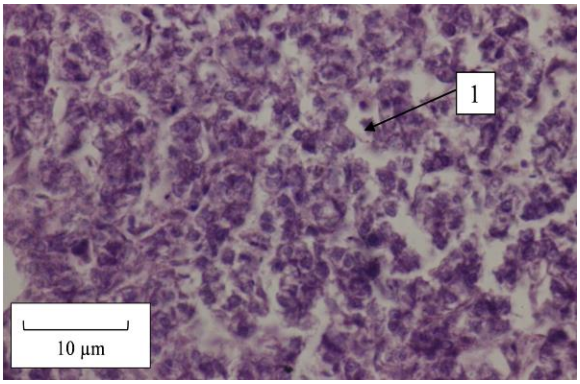

Fig. 3. Liver of broiler chickens of the first experimental group at the beginning of the withdrawal period. Hematoxylin and eosin stained sections: 1 – hepatocytes in the state of granular dystrophy.

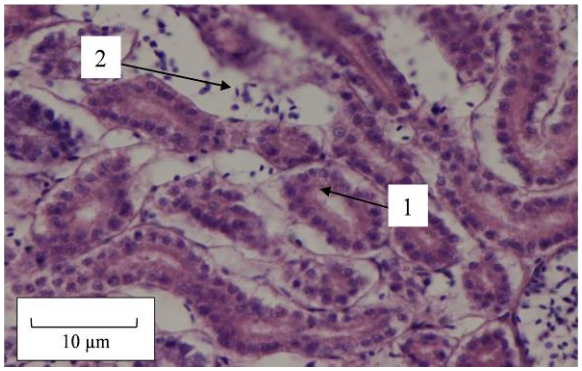

Fig. 4. Kidneys of broiler chickens of the first experimental group at the beginning of the withdrawal period. Hematoxylin and eosin stained sections: 1 – epithelial cells of the renal tubules in the state of granular dystrophy; 2 – lymphocytic infiltration of interstitial tissue.

Pathological changes were observed in the intramuscular connective tissue in myocardium. Collagen fibers were loose, flaky, poorly stained. There was focal lymphocytic infiltration of the intramuscular connective tissue (Fig. 5).

At the end of the withdrawal period, on the day 6, the same changes were observed, but focal lymphocytic infiltration of the intramuscular connective tissue of the myocardium was less pronounced (Fig. 6).

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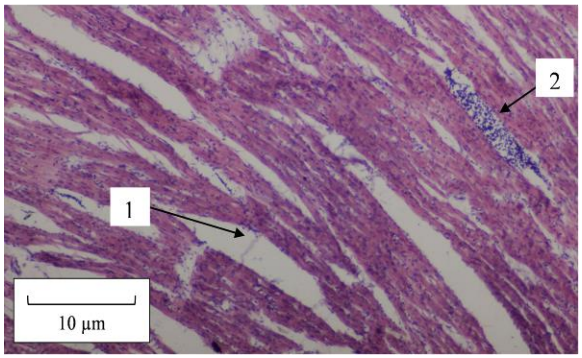

Fig. 5. Myocardium of broiler chickens of the first experimental group at the beginning of the withdrawal period. Hematoxylin and eosin stained sections: 1 – edema; 2 – lymphocytic infiltration of the intramuscular connective tissue

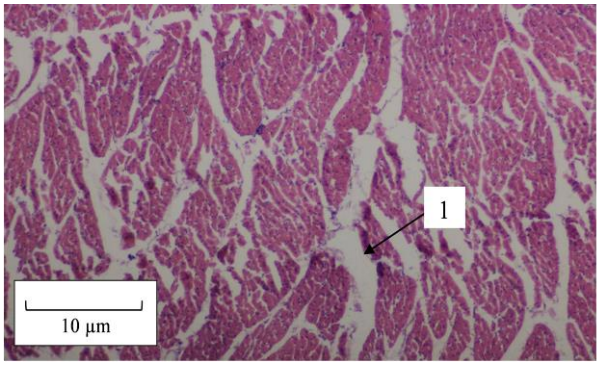

Fig. 6. Myocardium of broiler chickens of the first experimental group at the end of the withdrawal period. Hematoxylin and eosin stained sections: 1 – edema of the intramuscular connective tissue

In the liver, in addition to the above described changes, sometimes they observed the growth of the round or oval interlobular connective tissue, with chaotic direction of collagen fibers and a large number of fibroblasts and fibrocytes; growth areas were infiltrated by lymphoid cells. Similar changes were also observed in the interstitium of the kidneys (Fig. 7, 8).

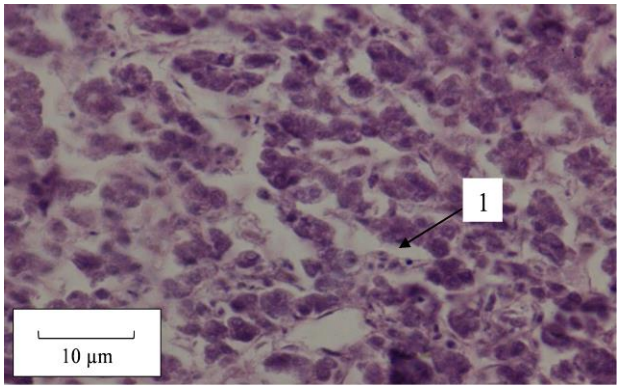

Fig. 7. Liver of broiler chickens of the first experimental group at the end of the withdrawal period. Hematoxylin and eosin stained sections: 1 – lymphocytic infiltration of the interlobular connective tissue

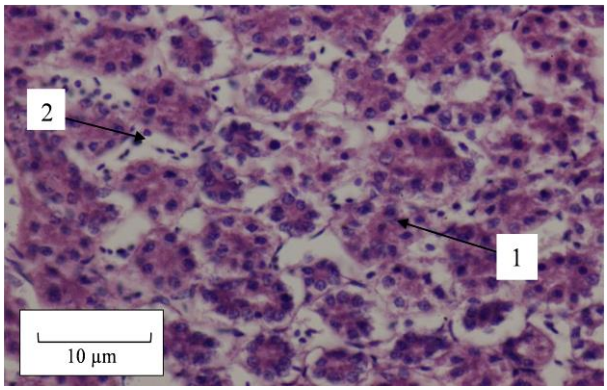

Fig. 8. Kidneys of broiler chickens of the first experimental group at the end of the withdrawal period. Hematoxylin and eosin stained sections: 1 – epithelial cells of the renal tubules in the state of granular dystrophy; 2 – lymphocytic infiltration of the interstitial tissue.

Broiler chickens of the second experimental group had the following histological changes at the beginning of the withdrawal period: in the liver – a granular dystrophy of individual hepatocytes (cells were of a bigger size, the nuclei were poorly stained, cytoplasm had a foamy appearance); in the kidneys – grainy dystrophy of a sufficiently large number of tubules (epithelial cells were enlarged in size, the nucleus were badly visualized, cytoplasm was of pinkish-gray color, the space between tubules narrowed or was completely absent); in the myocardium – insignificant focal lymphoid cortical infiltration of the intramuscular connective tissue (Figs. 9, 10, 11).

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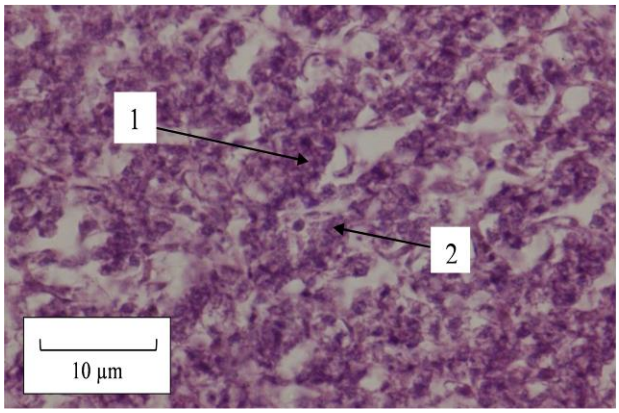

Fig. 9. Liver of broiler chickens of the second experimental group at the beginning of the withdrawal period. Hematoxylin and eosin stained sections: 1 – hepatocytes in the state of the granular dystrophy; 2 – of the fatty dystrophy

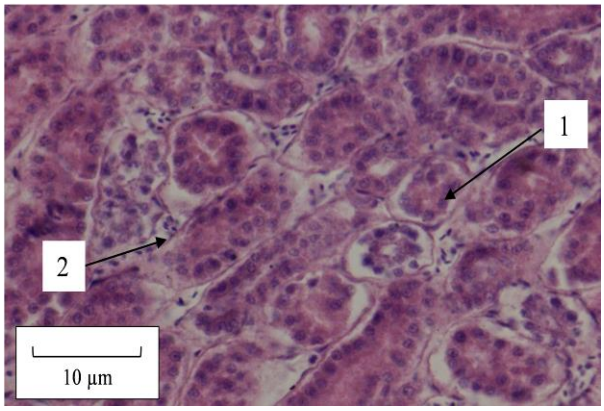

Fig. 10. Kidneys of broiler chickens of the second experimental group at the beginning of the withdrawal period. Hematoxylin and eosin stained sections: 1 – epithelial cells of the renal tubules in the state of granular dystrophy; 2 – lymphocytic infiltration of interstitial tissue.

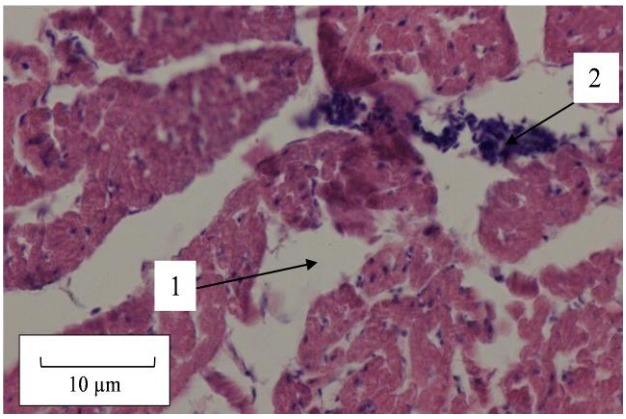

Fig. 11. Myocardium of broiler chickens of the second experimental group at the beginning of the withdrawal period. Hematoxylin and eosin stained sections: 1 – edema; 2 – lymphocytic infiltration of the interamuscular connective tissue.

At the end of the withdrawal period, on the 9th day of the experiment, they observed in the liver hepatocytes in the state of granular dystrophy: they were enlarged in size, the nuclei were poorly stained, the cytoplasm was a bit foamy and in the state of fatty infiltrative dystrophy, so had an annular look, nucleus were shifted to a peripheral tory cell, the cytoplasm was transparent, since the fat is being washed out in process of histological preparations manufacturing. The interlobular connective tissue was infiltrated by the cells of the lymphoid series, sometimes showed its growth of a round or oval shape, with a chaotic direction of collagen fibers and a large number of fibroblasts and fibrocytes. The growth areas were also infiltrated by lymphoid cells (Fig. 12).

In renal glomeruli there were no changes. The part of tubules of the epithelium was found in a state of granular dystrophy – the epithelial cells were enlarged in size, the nucleus are badly visualized, the cytoplasm was of pinkish-gray color, the space between tubules narrowed or was completely absent. The connective tissue was infiltrated by the lymphoid series cells, occasional cases of its enlargement of round or oval shape, with chaotically directed collagen fibers and a large number of fibroblasts and fibrocytes (Fig. 13).

Pathological changes in myocardium revealed only minor focal lymphoediocytic infiltration of intramuscular connective tissue (Fig. 14).

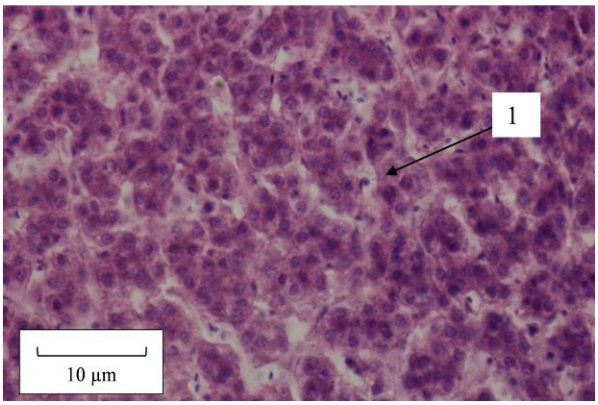

Fig. 12. Liver of broiler chickens of the second experimental group at the end of the withdrawal period. Hematoxylin and eosin stained sections: 1 – hepatocytes in the state of fatty dystrophy.

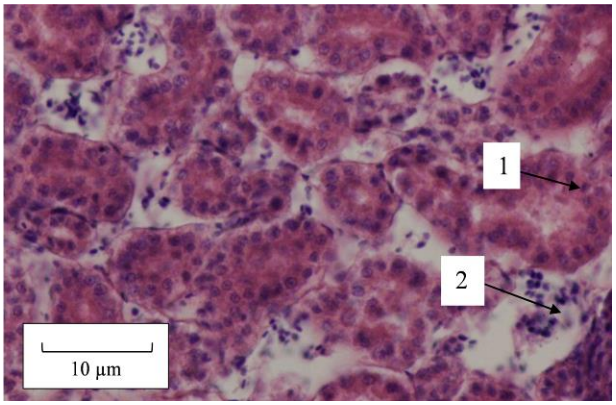

Fig. 13 . Kidneys of broiler chickens of the second experimental group at the end of the withdrawal period. Hematoxylin and eosin stained sections: 1 – epithelial cells of the renal tubules in the state of granular dystrophy; 2 – lymphocytic infiltration of interstitial tissue.

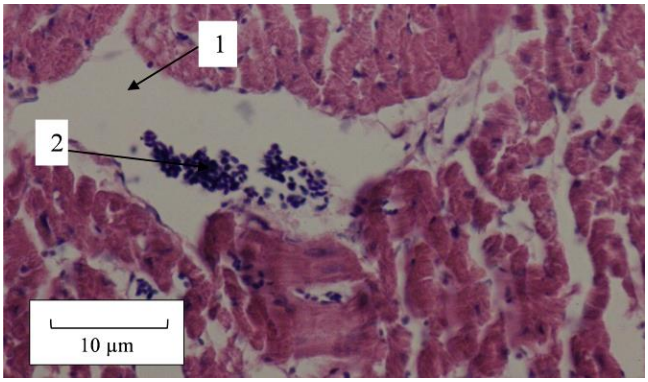

Fig. 14. Myocardium of broiler chickens of the second experimental group at the end of the withdrawal period. Hematoxylin and eosin stained sections: 1 – edema; 2 - lymphocytic infiltration of intramuscular connective tissue.

Broiler chickens' liver from the first and second control groups (received histological preparations) consisted of hexagonal-irregular-shaped tubules. Inside the tubule there was a central vein, from which sinusoidal capillaries departed, located between the hepatic beams. Beams were formed by two rows of hepatocytes, diverging radially from the center of the tubule. Hepatocytes had a square-round shape, the pink cytoplasm, blue nucleus and were in the center of the cell. Between the tubules there were the spaces of loose fibrous connective tissue (interstitium). In this connective tissue there were bile ducts and arterial and venous intercellular vessels.

The kidneys of broiler chickens of control groups were histologically consicted of renal tubules, glomeruli and interstitial tissues. The glomeruli had a rounded form and were represented as a plexus of blood capillaries surrounded by a Bowman-Shumlyansky capsule. Tubules were found in longitudinal, transverse and diagonal sections. They were lined with a single-row cuboid epithelium located on the basement membrane. Spaces were empty. Between the glomeruli and the tubules there were thin layers of loose fibrous connective tissue (interstitial).

The myocardium consisted of the strained muscle fibers, which consisted of cardiomyocytes – elongated dual-core cells. The nuclei were in the center of the cells and were blue, cytoplasm – bright red. Cardiomyocytes were joined together by anastomosis. Between the muscle fibers there were thin layers of loose fibrous connective tissue in which blood vessels were observed.

The structure of the internal organs of broiler chickens of the first and the second control groups (receiving histological preparations), was found within the normal range.

DISCUSSION

Despite the fact that in Europe the use of antibiotics in livestock raising and poultry farming is limited, scientists still continue to justify the rejection of their application by investigating toxic, allergenic reactions, dysbiosis etc., from the use of food products with the residual quantities of antibiotics, antibiotic resistance [3].

The use of macrolides together with probiotics for treatment in central and eastern European countries makes it possible to grow broiler chickens effectively [20]. Antibiotics of macrolide group do influence on the microbiota of the gastrointestinal tract and the immune system of animals, which is confirmed on animal models [21], and the development of changes in organism, tissues and cells can be discussed in the future after conducting individual studies. Antibiotics are known to inhibit protein biosynthesis, and therefore there are appropriate methodological approaches to their use, in particular, aminoglycosides – to determine the localization of transport-matrix ribonucleic acid interactions on the 30S ribosomal subunit [22]. Similar research studies focus on the study of the interaction of tylosin with a large ribosomal subunit 50S in *Escherichia coli* [23], which confirms the inhibition of protein biosynthesis.

We found some morphological changes in the internal organs; in particular, hepatocytes in the liver were in a state of a granular dystrophy (the presence of coarse protein grains) after the use of antibiotics of the macrolide group for broiler chickens with a therapeutic and prophylactic purpose. The liver cells were enlarged and had a swollen appearance. Obviously, the protein and water content was increased in their cytoplasm; they also observed the decrease in the intensity of the reaction to the general and basic protein, since the basis of such a degeneration is the decay of the protein-lipid complex, which is a part of the membranes of organelles. Granular dystrophy causes the water-salt metabolism violation, the intensity of oxidation-reducing processes is changed, oxidative phosphorylation is broken down, and the accumulation of acidic exchange products is violated. It is known that granular dystrophy has a compensatory and adaptive character, and therefore does not lead to functional liver failure and is a reverse process. Such dystrophy is the most common type of hepatocyte lesion due to various pathogenic (including toxic) effects. Histologic changes in the liver tissue show an intensification of protein synthesis processes, which may be due to the transformation of macrolides in this organ at first, and on the other hand, by the effects of antibiotics on the biosynthesis of proteins themselves (which are neutralized).

It is known that probiotics affect the increase in body weight [11] and increase immunity [24], reduce mortality [12], are safe for the environment, stabilize intestinal microflora, reduce the content of ammonia in excreta, increase the degree of assimilation of feed [17]. Simultaneous use of probiotics and synbiotics reduced mortality, increased live weight, had antioxidant properties [15]. Similar results on the use of probiotics and prebiotics were obtained by other scientists [14]. No data are available on the effects of probiotics on the morphology of the internal organs of animals and poultry. Our research shows that the "Probix" probiotic additive does not affect any morphological structures of the internal organs.

The next stage of our study is turned to be the need to investigate the histological structure changes of the internal organs of broiler chickenswhen using antibiotics and probiotics simultaneously with the prophylactic purpose, and the possibility of reducing prophylactic rates of antibiotics.

CONCLUSIONS

Histological and structural changes of the internal organs of broiler chickens were not found when using the "Probix" feed additive in their main diet. However, when using the antibiotics of the macrolide group with a therapeutic and prophylactic purpose, their negative effects on the poultry body were observed.

In the liver of broiler chickens, under the influence of treatment rates of pharmazin and tilotsiklinvet, within the withdrawal period, a granular and fatty dystrophy of hepatocytes, interstitial lymphoediocytic hepatitis, fibrosis were observed; in the kidneys – granular dystrophy of the epithelium of the tubules, diffuse interstitial lymphoediocytic nephritis, fibrosis; in the myocardium – edema of the intramuscular connective tissue, myocardiosclerosis.

The most pronounced pathological changes were found in broiler chickens' bodies, which were fed with pharmazin, somewhat lower – for those, which were fed with tilotsiklinvet at the beginning of the withdrawal period.

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