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Indicators of broiler chickens' slaughter after Pharmazin® and Tilotsiklinvet®

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Chemicals of the macrolide group – Pharmazin® and Tilotsiklinvet® – are widely used in veterinary practice in poultry farming for treatment or prevention in Ukraine. We have conducted a study on the pharmazin and tilotsiklinvet influence on the weight of broiler chickens before a slaughter; the weight of semi-dressed and dressed carcasses and internal organs of broiler chickens; the slaughter yield of broiler chicken carcasses and the ratio of their internal organs to a slaughter yield. Four groups of broiler chickens of the Cobb 500-day-old cross-breed were formed: two controls and two experimental (12 broiler chickens each). Chickens of the first experimental group were fed with pharmazin containing the active substance (AS) tylozine tartrate 500 mg per 1 g, and the second – with a tilotsiklinvet containing the (AS) tylozine tartrate and doxycycline glycate of 100 mg per 1 g of powder. Pharmazin and tilotsiklinvet were fed orally with a water at a dose of 1 g per 1 dm^3 of water according to the instructions for their use. These antibiotics were fed to broiler chickens with preventive purpose for the first 3 days of life, 28−29 and 38−42 days of the experiment. At the end of the antibiotics feeding, 6 broiler chickens from each group were slaughtered at the beginning of the elimination period (after 3 hours) and after the end of the withdrawal period (after 5−8 days), respectively, after the last pharmazin and tilotsiklinvet usage. It has been established that the use of pharmazin and tilotsiklinvet positively affects the productivity of chicken broilers. As a result, one can observe a significant increase in weight of broiler chickens before a slaughter ($p \leq 0,001$, $p \leq 0,01$). Slaughter yield increased by 8,2% when feeding pharmazin, and tilotsiklinvet – by 4,3%. Also, the weight of all the edible internal organs increased when using pharmazin and tilotsiklinvet ($p \leq 0,05$) and the weight of the liver and muscular part of the stomach when using tilotsiklinvet ($p \leq 0,05$).
Key words: pharmazin; tilotsiklinvet; broiler chickens; live weight; slaughter yield

Introduction

The research relates to the technology of production and quality of poultry production. The introduction of intensive poultry production technologies involves the use of antibacterial chemicals for both, a treatment ora prevention. Antibiotics can also be used as a feed to speed up the live weight gaining, including a live weight ofbroiler chickens. The combination of antibiotic properties that are used for a prophylactic purpose and while can serve as a feed is an urgent matter today.

Use of antibiotics in livestock breeding and poultry production can cause bacterial resistance to antibiotics (Stepien-Pysniak et al., 2016; Kowalczyk et al., 2017), the accumulation of residual quantities of products of slaughter (Fotina, 2007; Kaniuka, Pavliv, 2009; Gbylik-Sikorska et al., 2016). Scientists are searching for new growth stimulants, including for broiler chickens, which have no negative impact on the safety and quality of animal feed products. There are reports of using oregano oil to accelerate growth and increase the weight of broiler chickens (Zamora et al., 2017), essential oil of carvacrol (Kelly et al., 2017), phytogenic feed additives (Reyer et al., 2017), plant extracts (Waheed et al., 2017), etc.

Among those numerous antibiotics used in livestock and poultry farming, chemicals of the macrolide group – pharmazin and tilotsiklinvet – are widely used in veterinary practice in poultry farming for treatment and prevention in Ukraine. An important task for specialists in veterinary medicine is to provide medical and preventive measures with such chemicals that could minimize the risks for the birds' organisms and consumers of the product (Fotina, 2012; Iakubchak et al., 2017). There is no information about the simultaneous use of pharmazin and tilotsiklinvet as antibioticsfor preventive purposes and their influence on the increase of live weight of broiler chickens.

The aim and the task of research are to study the influence of pharmazin and tilotsiklinvet on the weight of broiler chickens before a slaughter, the weight of semi-dressed and dressed carcasses and internal organs of broiler chickens; the slaughter yield of broiler chicken carcasses and the ratio of their internal organs to the slaughter yield.

Methods

To conduct the experiment, four groups of broiler chickens of the Cobb 500-day-old cross-breed were formed: two controls and two experimental (12 broiler chickens each). Chickens of the first experimental group were fed with pharmazin containing the active substance (AS) tylozine tartrate 500 mg per 1 g, and the second – with a tilotsiklinvet containing the (AS) tylozine tartrate and doxycycline glycate of 100 mg per 1 g of powder. Pharmazin and tilotsiklinvet were fed orally with a water at a dose of 1 g per 1 dm^3 of water according to the instructions for their use. These antibiotics were fed to broiler chickens with preventive purpose for the first 3 days of life, 28−29 and 38−42 days of the experiment. At the end of the antibiotics feeding, 6 broiler chickens from each group were slaughtered at the beginning of the elimination period (after 3 hours) and after the end of the withdrawal period (after 5−8 days), respectively, after the last pharmazin and tilotsiklinvet usage.

In all groups the clinical status of broiler chickens, the activity of receiving food and water was determined daily. Measurement of the microclimate parameters in the premises was carried out according to the generally accepted methods.

Antibiotic solutions were prepared daily and they were in the drinking bowls for the first three days of life, on the 28−29 and 38−42 days of experiment. During this period, the aqueous solution of pharmazin and tilotsiklinvet was the only source of water supply for broiler chickens in the experimental groups, while control groups received the main diet.

The live weight of the poultry was determined by weighing on scales of the "Ohaus" brand by the generally accepted method (with an accuracy of ± 1 g) on the 1, 7, 14, 28, 38, 42 days of conducting the experiment. They determined the carcasses slaughter yield, the weight of semi-dressed and dressed carcasses, and theweight of edible internal organs. The slaughter of poultry was performed according to the established technological instructions in accordance with the current Regulations.

Statistical processing of the obtained results was carried out using the methods of variation statistics. Reliability was determined by the Student's test, considering the significance level: $p \leq 0.05$; $p \leq 0.01$, $p \leq 0.001$.

Results and Discussion

For a more detailed study of the influence of pharmazin and tilotsiklinvet on the body of broiler chickens, the slaughter yield of carcasses was analyzed (Table 1, 2).

Table 1. Indicators of slaughter yield of carcasses of broiler chickens of the experimental group, which were fed with pharmazin, M±m; n=6

Indicator	Withdrawal period	First experimental group (pharmazin)	First control group
Live weight before a slaughter, g	3 hours	2525.2±49.9	2348.3±44.0
	6 days	2636.2±40.8*	2394.2±33.1
Weight of semi-dressed carcass, g	3 hours	2369.5±45.8*	2058.5±49.4
	6days	2440.3±61.1**	2193.2±47.1
Weight of dressed carcass, g	3 hours	2053.2±51.8*	1748.8±39.1
	6days	2143.2±65.0***	1913.3±49.5
Slaughter yield, %	3 hours	81.3	74.5
	6 days	81.3	79.9

Note: * p≤0.001. ** p≤0.01. *** p≤0.05. compared to the control

Table 2. Indicators of slaughter yield of carcasses of broiler chickens of the experimental group, which were fed with tilotsiklinvet, M±m; n=6

Indicator	Withdrawal period	Second experimental group (tilotsiklinvet)	Second control group
Live weight before a slaughter, g	3 hours	2560.8±52.2**	2289.0±60.3
	9 days	2673.0±47.0*	2393.8±34.3
Weight of semi-dressed carcass, g	3 hours	2358.3±52.8**	2093.8±49.8
	9days	2466.5±51.8**	2184.8±58.5
Weight of dressed carcass, g	3 hours	2074.2±60.4**	1793.8±49.8
	9days	2171.0±42.5*	1892.3±43.1
Slaughter yield, %	3 hours	80.5	78.4
	9days	81.2	79.0

Note: * p≤0.001, ** p≤0.01, compared to the control

The data in Tables 1, 2 show a significant (p≤0,001, p≤0,01, p≤0,05) increase in alive weight before a slaughter, the weight of semi-dressed and dressed carcasses in experimental groups, compared to controls at the beginning and at the end of the withdrawal period.

Thus, a live weight of chicken broilers before a slaughter in the experimental group (fed with pharmazin) at the beginning of the withdrawal period (in 3 hours after the last feeding of antibiotic) exceeded the body weight of the bird in the first control group by 7,5%. A live weight of broiler chickens before a slaughter in the experimental group (fed with tilotsiklinvet) was by 11,9% higher than the body weight of the bird of the second control group.

Live weight of broiler chickens before a slaughter in the first experimental group at the end of the withdrawal period (6 days after the last antibiotic feeding) was by 10,1% higher than the weight of a poultry in the control group. Live weight of broiler chickens before a slaughter in the second experimental group at day 9 was by 11,7% higher than the one in the second control group. Data analysis shows that antibiotics stimulate growth of a bird and this influences both, on a live weight and on a slaughter yield.

It is known that semi-dressed carcasses are those, whichhave no stun, are bled out, the intestine with cloaca, filled dewlap andoviduct (for females) are removed. Weight of semi-dressed carcasses of broiler chickens of the first experimental group at the beginning of the elimination period exceeded the weight of the carcasses of the first control group by 15,1%, and the weight of the second experimental group was higher than the indicator of the second control group by 12,6%.

In addition, the weight of semi-dressed carcasses of broiler chickens of the first experimental group at the end of the withdrawal period exceeded the weight of the carcasses of the first control group by 11,2%, and the weight the second experimental group was higher than the weight of the carcasses of the second control group by 12,9%.

It is also known that dressed poultry carcasses are without internal organs, a head (between the second and the third cervical vertebrae), a neck (without skin) – where shoulder joints, the limbs to the metatarsus or below, but not more than 20 mm, with an internal fat. The weight of the broiler chickens'carcasses of the first experimental group at the beginning of the half-life period was by 17,4% higher than the weight of the carcasses of the first control group, and the weight of broiler chickens' carcasses of the second experimental group exceeded the weight of the carcasses of the second control groupby 15,6%.

The weight of the broiler chickens' carcasses of the first experimental group at the end of the elimination period was by 12,0% higher than the weight of the carcasses of the first control group, and the weight of the broiler chickens' carcasses of the second experimental group was by 14,7% higher than that of the second control group.

Slaughter yield of broiler chickens' carcasses of the experimental group (which were fed with pharmazin) was by 6,8% higher than in the first control group, and the slaughter yield of poultry of experimental group (were fed with tilotsiklinvet) exceeded indicators of the second control group by 2,1%. At the end of the withdrawal period, the slaughter yield of broiler chickens' carcasses of the first experimental group was by 1,4% higher than that of the first control group, and the difference in the slaughter yield of the bird of the second experimental group was2,2%, as compared to the control.

To determine the functional load on the internal organs of broilerchickens, they hadanalyzed the ratio of the edible internal organs weight to the slaughter yield (Tables 3, 4).

Table 3. Weight of the edible internal organs of broiler chickens, which were fed with pharmazin (g), M±m; n=6

Indicator	Withdrawal period	First experimental group (pharmazin)	First control group
Liver	3 hours	47.2±1.6	39.2±1.1
	6 days	49.8±1.8*	42.8±1.7
Weight of liver relative to the slaughter yield, %	3 hours	2.3	2.2
	6 days	2.3	2.2
Heart	3 hours	9.4±1.2	6.6±1.0
	6 days	10.0±0.6*	7.4±0.5
Weight of heart relative to the slaughter yield, %	3 hours	0.4	0.4
	6 days	0.5	0.4
The muscular part of the stomach	3 hours	29.8±1.2	24.8±1.5
	6 days	32.1±1.9*	26.0±1.1
Weight of the muscular part of the stomach relative to the slaughter yield, %	3 hours	1.4	1.4
	6 days	1.5	1.3

Note: * p≤0.05, compared to the control

The analysis of the results presented in Table 3 shows a significant increase in the weight of the edible internal organs of the broiler chickens of the experimental group fed with pharmazin compared to the first control group (p≤0.05) at the end of the withdrawal period.

From the data in Table 4, it has been found that in the experimental group (fed with tilotsiklinvet) was a significant increase in liver and muscular part of the stomach weight compared with the second control group (p ≤0.05) after the withdrawal period.

The weight of the liver of broiler chickens of the experimental group fed with pharmazin at the beginning of the withdrawal period was by 20.4% higher than the weight of the liver of the of the first control group; the weight of the liver of broiler chickens of the experimental group fed with tilotsiklinvet was by 15.8% higher than in the second control group. After the elimination

period, the weight of the liver of broiler chickens in the first experimental group was by 16.3% higher than the weight of the liver of birds of the first control group, and the weight of the liver of broiler chickens of the second experimental group was by 16.4% higher, compared with the second control group.

The weight of the liver of the broiler chickens of the first experimental group, relative to the slaughter yield, was by 4.5% higher than the weight of the liver of the first control group at the beginning and at the end of the withdrawal period. The weight of the bird's liver in the second experimental group and the second control group relative to the slaughter yield was 2.05% at the beginning of the elimination period. At the end of the withdrawal period, the weight of the liver of broiler chickens of the second experimental group relative to the slaughter yield exceeded the weight of the liver of the bird of the second control group by 1.4%.

Table 4. Weight of the edible internal organs of broiler chickens, which were fed with tilotsiklinvet (g), M±m; n=6

Indicator	Withdrawal period	Second experimental group (tilotsiklinvet)	Second control group
Liver	3 hours	42.6±1.1	36.8±2.6
	9 days	45.4±1.5*	39.0±1.6
Weight of liver relative to the slaughter yield, %	3 hours	2.05	2.05
	9 days	2.09	2.06
Heart	3 hours	10.7±1.2	8.2±1.2
	9 days	11.5±0.7	9.2±0.9
Weight of heart relative to the slaughter yield, %	3 hours	0.5	0.4
	9 days	0.5	0.5
The muscular part of the stomach	3 hours	31.8±1.1	26.4±1.6
	9 days	33.5±1.4*	28.4±1.1
Weight of the muscular part of the stomach relative to the slaughter yield, %	3 hours	1.5	1.5
	9 days	1.5	1.5

Note: * p≤0.05, compared to the control

In our opinion, an increase in the absolute weight of the liver of broilerchickens is due to the fact, that the metabolism of tilozyne flows mainly in the liver and the highest concentration of antibiotics is achieved precisely in the liver, because it is involved in the elimination of antibacterial substances in a body.

At the beginning of the withdrawal period, the heart weight of broiler chickens of the first experimental group exceeded the weight of the heart of the bird of the first control group by 42.4%, and the weight of the heart of the bird of the second experimental group was by 30.5% higher than that of the chickens of the second control group. At the end of the withdrawal period, the weight of the heart of broiler chickens of the first experimental group exceeded the indicators of the first control group by 35.1%, and the heart weight of the birds of the second experimental group was higher by 25.0% than that of the second control group.

The weight of the heart of broiler chickens of the first experimental and the first control group relative to the slaughtered yield was 0.4% at the beginning of the withdrawal period. The weight of the heart of the bird of the second experimental group and the second control group was 0.5% at the end of the elimination period, while the weight of the heart of the bird of the first experimental group at the end of the withdrawal period and the weight of the heart of broiler chickens of the second experimental group at the beginning of the elimination period relative to the slaughter yield exceeded the indicators of the first and the second control groups by 25.0%.

The weight of the muscular part of the stomach of broilerchickens of the first experimental group at the beginning of the withdrawal period exceeded the bird's stomach weight of the first control group by 20,2%, and of the second experimental group − by 20.4%. At the end of the elimination period, the weight of the muscular part of the bird's stomach of the first experimental group was higher than that of the first control group of broiler chickens by 23.4%, and of the second experimental group – by 17.9%.

The weight of the muscular part of the stomach relative to the slaughtered yield of a poultry of the first experimental and the first control group was 1,4% at the beginning of the withdrawal period. At the end of the elimination period, the weight of the muscular part of the stomach of broiler chickens of the first experimental group exceeded the indicator of the first control group by 15,4%. At the beginning and after the withdrawal period the weight of the muscular part of the stomach relative to the slaughter yield of the second experimental and second control group was 1.5%.

In our opinion, an increase in the weight of the muscular part of the stomach is due to the fact, that the oral feedingwith antibiotics stimulates the appetite of birds, so chickens consume more food, which partially stays in stomach.

Approbation of research results

The obtained research results are tested and implemented in production of “Podilsky Broiler” LLC, Dunaevetsky District, Khmelnytsky Region, Ukraine.

Conclusions

The positive influence of pharmazin and tilotsiklinvet on the productivity of broiler chickens has been experimentally proved, which is evinced in a significant increase in the indicators of broiler chicken's weight before a slaughter (p≤0.001, p≤0.01), as well as the slaughter yield of poultry carcasses, in particular – the weight of semi-dressed carcasses of birds (p ≤0.05).

Slaughter yield of carcasses is significantly higher (by 8.2%) in the experimental group of broiler chickens, which were fed with pharmazin, compared with the control; and in the experimental group of broiler chickens, which were fed with tilotsiklinvet, a slaughter yield was higher by 4.3%, as compared to the control group.

Analysis of the research results shows a significant increase in weight of the edible internal organs of broiler chickens of the experimental group (fed with pharmazin) compared with the first control group (p≤0.05) at the end of the withdrawal period. In the experimental group of broiler chickens, which were fed with tilotsiklinvet, a significant increase in liver weight and muscle part of the stomach was observed, compared with the second control group (p≤0.05), after the withdrawal period.

Pharmazin and tilotsiklinvet can serve as a substitute for feed antibiotics, and can be used simultaneously as a preventive way to reduce a stress on the body broiler chickens, but does not reduce the quality of products of slaughter.

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