
IMPACT OF BIOR AND BUTOFANON SOME PARAMETERS OF LIPID METABOLISM IN ADULT QUAIL PLACED IN RECONDITIONING

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Abstract. At present, the positive effect of BioR remedy obtained by original technologies from the biomass of cyanobacterium *Spirulina platensis* was demonstrated at the Academy of Sciences of the Republic of Moldova on pigs, rabbits and broilers. Considering the fact that remedies of vegetal origin are not harmful to animals, people and environment, they are of particular interest to the most developed branch of animal husbandry – the aviculture, including for the production and exploitation of quail. Until present, studies on the action of the nominated preparation on the physiological-metabolic status, including lipid metabolism in quail for reconditioning have not been conducted. The biological material was 150 quail at the end of the laying cycle divided into 3 batches of 50 birds. The tested preparation was administered intramuscularly to the quails two times consecutively at the onset of the study and secondly at 14 days after the first administration at a dose of 0,5 ml /head. In another experimental batch, the commercial product Butofan was administered in order to compare the obtained results. Birds of the control group received 0,5 ml of solution of NaCl of 0,9 % in both terms. The birds included in the study were analogous in terms of race, age, body weight and physiological status. During all time of the study, quails were monitored: clinical parameters, body weight, and number of eggs. In addition, for laboratory investigations, blood was collected from five quails at the start of the study before the tested preparations were administered and then 2 times during the study. It has been established that the tested remedies do not cause adverse reactions or deviations in quails' health. Moreover, BioR showed adaptive properties, reflected in body temperature lower by 0,32 C than the control group and 0,18 C than the group treated with Butofan. Similar manifestations were also found in birds' breathing. Biochemical researches performed on quails that have benefited from the BioR remedy reveal a true decrease in total lipids in one investigation and an increase in triglycerides at this stage and their decrease at the end of the study. Additionally, both BioR

and Butofan remedies induced an increase in the blood serum of β -lipoproteins at both stages of research, while cholesterol values did not show any essential changes. In conclusion, we can state that the BioR product has a beneficial effect on quail, including their lipid metabolism.

Keywords: *Quails, BioR remedy, lipid metabolism, physiological status, reconditioning*

Introduction.

Aviculture is a relative new branch in zootechnics, and in the national economy with many directions of activity focused on obtaining hybrids with high genetic-productive potential, offering birds optimal terms of growth and exploitation, feed proper to the species, age and category of birds. Despite the decline of livestock in the Republic of Moldova, aviculture in the past twenty years reanimated and even extended particularly great.

To be specified the fact that extension of this branch occurred not only as a result of scientifically-technical progress, but also due to gustative and dietetic qualities of poultry products (meat, eggs), to their accessibility to social vulnerable class. At the same time another part of this problem can be focused on the short reproduction time and bird breeding, accessibility and their morph-physiological possibility to be elevated in industrial conditions of poultry factory. More than that, contrary to other branches of zootechnics, aviculture deals with growth and exploitation of many species of birds. However, the approach of growth and exploitation of birds is different from one species to another, depending on the knowledge level, their adaptability and economic development on one hand and microclimate conditions for different species of birds on the other hand.

Analysis of recent research and publications.

Currently, priority is given to medicinal products of natural origin, especially vege-

table. Thus, these requirements are current and necessary for zootechnics specialists, animal owners. (Macari et al., 2014; Rudic et al., 2007; Attia et al., 2011; Macari, 2015; Khan et al., 2012). At the same time, it is worth mentioning that a medicinal remedy from *Spirulina platensis* - BioR was developed in Moldova (Rudic, Gudumac, 1996). This remedy is of plant origin and corresponds to all requirements submitted to drugs, both for human and animal use, being successfully tested on humans and animals (Rudic et al., 2007; Macari et al., 2018). It is therefore of interest to study this BioR preparation in parallel with another known drug remedy - Butofan.

Material and methods.

In the study the biological material was represented by 150 quail at the end of the laying cycle divided into 3 lots of 50 birds. The test remedy was administered intramuscularly to the quails two times consecutively at the onset of the study and secondly at 14 days after the first administration at a dose of 0,5 ml/head. Another experimental lot was administered the alternative product Butofan to compare the results obtained. Birds of the control group received 0,5 ml of sol NaCl of 0,9%. The pattern of administration of the test preparations is shown in table 1.

The quails included in the study were similar in terms of body weight, age, physiological status and were in identical conditions on: feeding and maintenance, microclimate and veterinary services. Birds during the study were continuously monitored and clinically investigated (individual weighing

1. Scheme of administration of BioR and Butofan preparations to adult quail placed in reconditioning

Group of Animals	Nr. Of Birds	Dose and time of administration, ml/head		Mode of administration
		1st administration (on the onset of study)	2nd administration (on the 14th day after the 1st administration)	
CG	50	0,5 ml 0,9 % sol. NaCl	0,5ml 0,9% sol. NaCl	intramuscularly
EG-I	50	0,5 ml BioR	0,5ml BiOR	
EG-2	50	0,2 ml Butofan	0,2 ml Butofan	

was performed periodically with an interval of 10-14 days, temperature and respiratory movements were measured per minute).

Research results.

Following investigations over a 50-day period, the drugs tested, both BioR and Butofan, were well tolerated by adult quails, no adverse reactions at the injection site of the studied drugs in the pectoral muscles and also at the whole body. It has been established that the tested remedies do not cause adverse reactions or deviations in quails' health. Moreover, BioR showed adaptive properties, reflected in body temperature lower by 0,32° C than the control group and 0,18° C than the group treated with Butofan. Similar manifestations were also found in birds' breathing.

Of particular importance are the lipids and the nature of their metabolism in the study of functional status of the body, individual cells and subcellular elements, as well as in the evaluation of the quality of products obtained from agricultural birds. The results of the influence of these remedies on the main indicators of lipid metabolism are presented in table 2.

The data from table 2 show that the total lipid content in the blood serum for quail in the control group in the first study period was 12,5 % higher than at the beginning of the experiment. Using the test

formulations, the analysis showed that the best results of the total lipid versus control were significantly reduced in EG-I treated with BioR by 37,9 % ($p < 0,01$) and EG-2 with Butofan, with 31,1% ($p < 0,05$) lower than in control. At the end of reconditioning, this indicator in the control group was significantly lower by 1,6 than in the previous study ($p < 0,05$). These results repeat the late dynamics set in the first study in the experimental groups, confirming the validity of these findings and the analogy of the quail groups used. Indicators at the end of studies in experimental groups confirm this hypothesis when the total lipid content is close to the same level, which allows us to talk about the adaptogenic properties of both remedies studied.

According to table 2 in quail serum in the first stage, the cholesterol index was almost at the same level. The difference of this indicator was also insignificant at the end of the experiment, with a slight increase of 2,4-7,1 % compared to control.

The data in table 2 indicates a low triglyceride content in the serum in the control group, which was 16,3 % lower compared to the font. At the same time, quails in the experimental groups recorded an insignificant increase of this indicator by 6,8-28,4 %, compared to the control group. In addition, at the end of the study, on the contrary, there was an increase in the triglyceride content in the control

2. Influence of tested remedies on indicators of lipid metabolism at adult quails

Indicators	Fon	Group of animals		
		CG	EG-1	EG-2
Total lipids, g/l 1st administration 2nd administration	791,84 ± 75,05	890,51 ± 99,30 566,08 ± 5,06*	553,27 ± 12,53** 593,22 ± 10,20	595,48 ± 50,79* 596,98 ± 3,67
Cholesterol, mmol/l 1st administration 2nd administration	5,72 ± 0,16	5,68 ± 0,05 5,46 ± 0,06	5,67 ± 0,04 5,59 ± 0,16	5,50 ± 0,04 5,85 ± 0,19
Triglycerids, mmol/l 1st administration 2nd administration	3,49 ± 0,31	2,92 ± 0,28 3,10 ± 0,47	3,75 ± 0,43 2,89 ± 0,15	3,12 ± 0,16 2,86 ± 0,34
β-lipoproteins, g/l 1st administration 2nd administration	116,14 ± 4,60	88,78 ± 8,72* 91,74 ± 7,06	99,60 ± 8,07 107,28 ± 3,31	124,66 ± 10,61* 100,30 ± 5,09

NB: * $p < 0,05$; ** $p < 0,01$

group, which was 6,2 % compared to the first stage of the experiment. At the same time, it is attested that only in the experimental groups the difference of this indicator decreased compared to the control group by 6,8 -7,7 %. From table 2, it can be seen that, before starting the study, the medium β-lipoprotein content was 116,14 ± 4,60 g / l, the level at the control group at the first stage of the studies was 23,6 % lower compared to the baseline data ($p < 0, 05$). During the study, there was an increase in β-lipoprotein content in the blood serum: in the first stage - by 12,2-40,4 % ($p < 0,05$, for EG-2) and in the final stage of research with 9,3-16,9 %, respectively in both experimental groups compared to the control group.

The study shows that the BioR remedy obtained by advanced Spirulina platensis technology, administered twice a year, to adult quail at the end of the laying cycle, during the study, has a good local and general tolerance. In addition, the tested remedies are moderately involved in improving lipid metabolism in adult quail placed on reconditioning, which is also confirmed by better productive parameters in birds treated with biologically active remedies, especially BioR.

Conclusions and prospects.

Based on experimental data on the use of BioR, it has been established that this remedy has a pronounced normalization effect on lipid metabolism. This reflected a decrease in total lipids and contributed to an insignificant increase in blood cholesterol in quail during the research, and also contributed to increased serum triglycerides at the first stage and insignificant increase in beta-lipoproteins, suggesting that the test remedy improves lipid metabolism in quail.

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V. Макаръ, Н. Павліченко, А. Ротару, А. Пирлог (2021). ВПЛИВ ПРЕПАРАТИВ БІОР І БУТОФАН НА ЛІПІДНИЙ ОБМІН ДОРΟΣЛИХ ПЕРЕПЕЛІВ НА ВІДГОДІВЛІ.

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Анотація. Нині в Академії наук Республіки Молдова продемонстровано позитивну дію препарату Біор, отриманого за оригінальною технологією з біомаси ціанобактерій *Spirulina platensis*, вивченого на свинях, кролях і бройлерах. З огляду на той факт, що засоби рослинного походження не шкідливі для тварин, людей і навколишнього середовища, вони становлять особливий інтерес для найбільш розвинутої галузі тваринництва – птахівництва, в тому числі для виробництва та використання перепелів. До теперішнього часу дослідження на вплив досліджуваного препарату на фізіолого-метаболический статус, в тому числі ліпідний обмін у перепелів, що підлягають відновленню, не проводилися. Біологічний матеріал складався зі 150 перепелів, взятих в кінці циклу яйцекладки, розділених на 3 групи по 50 голів у кожній. Досліджуваний препарат вводили перепелам внутрішньом'язово два рази поспіль на початку дослідження і вдруге через 14 днів після першого введення в дозі 0,5 мл / голову. В іншій експериментальній групі був введений комерційний продукт БУТОФАН для порівняння отриманих результатів. Птахи контрольної групи в обидва терміни отримували 0,5 мл розчину NaCl 0,9%. Птахи, включені в дослідження, були аналогічними за породою, віком, масою тіла та фізіологічним статусом. Протягом всього періоду дослідження за перепелами спостерігали, відзначаючи такі показники: клінічні, масу тіла, кількість яєць. Крім того, для лабораторних досліджень кров брали у п'яти перепелів на початку дослідження перед введенням тестованих препаратів, а потім 2 рази під час дослідження. Встановлено, що випробувані засоби не викликають побічних реакцій і будь-яких відхилень у стані здоров'я перепелів. Більш того, Біор показав адаптивні властивості, що виявилось в температурі тіла нижче на 0,32 °С, ніж у контрольній групі, і на 0,18 °С, ніж в групі, що одержувала БУТОФАН. Подібні прояви були виявлені і в диханні птахів. Біохімічні дослідження перепелів, яким вводився препарат Біор, виявили справжнє зниження загальної кількості ліпідів в даному дослідженні і підвищення тригліцеридів на цьому етапі і їх зниження в кінці дослідження. Крім того, препарати Біор і БУТОФАН викликали підвищення рівня β -ліпопротеїнів в сироватці крові на обох етапах дослідження, в той час, як значення холестерину не показали будь-яких істотних змін. Резюмуючи, можна сказати, що продукт Біор сприятливо впливає на перепелів, в тому числі на їх ліпідний обмін.

Ключові слова: перепели, препарат Біор, ліпідний обмін, фізіологічний статус, відновлення.