ANIMAL SCIENCE AND FOOD TECHNOLOGY

Journal homepage: https://animalscience.com.ua/en
Animal Science and Food Technology, 12(1), 14-18
Received: x.xx.2021 Revised: x.xx.2021 Accepted: x.xx.2021

UDC 636.5.033:604(612.063)
DOI: 10.31548/animal2021.01.014

Impact of bior and butofanon some parameters of lipid metabolism in adult quail placed in reconditioning

Vasile Macari*[1], Natalia Pavlicenco[1], Ana Rotaru[1], Gheorghe Pistol[1], Mikhailo Mushtruk[2]

[1]State Agrarian University of Moldova
2049, 44 Mircesti Str., Chisinau, Moldova

[2]National University of Life and Environmental Sciences of Ukraine
03041, 15 Heroiv Oborony Str., Kyiv, Ukraine

Abstract. Taking into account the current trends in the development of the most developed branch of animal husbandry – poultry farming, it should be noted that the use of ecologically clean biological preparations based on plant raw materials is a relevant topic for research in the cultivation of various types of poultry, in particular quail. The purpose of the study is to analyze the effect of the BioR preparation, made according to the original technology from the biomass of cyanobacteria Spirulina platensis, on the physiological and metabolic status of groups of quail that are subject to recovery. 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 14 days after the first administration at a dose of 0.5 ml/head. In another experimental batch, the commercial product Butofan was administered to compare the obtained results. Birds of the control group received 0.5 ml of the 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 the 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 research performed on quails that have benefited from the BioR remedy reveals 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 ß-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 lipid metabolism. It has been proven that due to the use of the drug, a pronounced normalizing effect on the lipid metabolism of the experimental group of quails was obtained, due to a decrease in total lipids, which caused a slight increase in cholesterol in the blood of birds

Suggested Citation:
Macari, V., Pavlicenco, N., Rotaru, A., Pistol, G., & Mushtruk, M. (2021). Impact of bior and butofanon some parameters of lipid metabolism in adult quail placed in reconditioning. *Animal Science and Food Technology*, 12(1), 14-18.

*Corresponding author

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

Introduction

Aviculture is a relatively 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, feeding properly 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 [1].

To be specified the fact that extension of this branch occurred not only as a result of scientifically-technical progress but also due to the gustative and dietetic qualities of poultry products (meat, eggs), to their accessibility to socially vulnerable classes [2]. 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 factories [3], [4]. More than that, contrary to other branches of zootechnics, aviculture deals with the growth and exploitation of many species of birds. However, the approach to the 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 [5].

Currently, priority is given to medicinal products of natural origin, especially vegetables. Thus, these requirements are current and necessary for zootechnics specialists, and animal owners [6], [7], [8]. At the same time, it is worth mentioning that a medicinal remedy from Spirulina platensis – BioR was developed in Moldova [9]. 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 [10], [11]. 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 14 days after the first administration at a dose of 0.5 ml /head. Another experimental lot was administered with 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.

Table 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 (at the onset of the study)	2nd administration (on the 14th day after the 1st administration)	
CG	50	0.5 ml 0.9% sol. NaC1	0.5ml 0.9% sol. NaC1	intramuscularly
EG-I	50	0.5 ml BioR	0.5ml Bi0R	
EG-2	50	0.2 ml Butofan	0.2 ml Butofan	

The quails included in the study were similar in terms of body weight, age, and 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 was performed periodically with an interval of 10-14 days, and temperature and respiratory movements were measured per minute).

Research Results

Following investigations over 50 days, the drugs tested, both BioR and Butofan, were well tolerated by adult quails, with no adverse reactions at the

injection site of the studied drugs in the pectoral muscles and also in the whole body. Similar series of studies was described in scientific works [12], [13], but they were conducted for only 30 days with the use of other types of drugs, the action of which, in Shasha's opinion, could cause side effects and side reactions at the place of administration of the investigated drug. The authors of scientific papers [14], [15] established that the tested means used in conducting similar experiments caused adverse reactions and abnormalities in the health of quails and guinea fowls.

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 0.32ºC than the control group and 0.18ºC 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 the 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.

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

Indicators	Fon	Group of animals		
		CG	EG-I	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 1stadministration 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
Triglycerides, mmol/l 1 st 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
ß-lipoproteins, g/l 1 st 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*

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 the 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 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 ß-lipoprotein content was 116.14±4.60 g/l, and 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 ß-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

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 an insignificant increase in beta-lipoproteins, suggesting that the tested remedy improves lipid metabolism in quail.

References

[1] Ostachowicz, W., Soman, R., & Malinowski, P. (2019). Optimization of sensor placement for structural health monitoring: *A review. Structural Health Monitoring*, 18(3), 963-988. doi: 10.1177/1475921719825601.

[2] Mushtruk, M., Bal-Prylypko, L., Slobodyanyuk, N., Boyko, Y., & Nikolaienko, M. (2022). Design of Reactors with Mechanical Mixers in Biodiesel Production. Lecture Notes in Mechanical Engineering, 197-207. doi: 10.1007/978-3-031-06044-1_19.

[3] Attia, Y.A., Elhanoun, A.M., Bovera, F., Shewika, Y.E. (2011). Effect of bee pollen levels on productive, reproductive, and blood traits of NZW rabbits. *Journal of Animal Physiology and Animal Nutrition*, 95, 294-303.

[4] Bal-Prilipko, L.V., Patyka, N.V., Leonova, B.I., Starkova, E.R., & Brona, A.I. (2016). Trends, Achievements, and Prospects of Biotechnology in the Food Industry. *Mikrobiolohichnyi Zhurnal*, 78(3), 99-111. doi: 10.15407/microbiolj78.03.099.

[5] Khan, R.U., Naz, S., Nikousefat, Z., Tufarelli, V., Laudadio, V. (2012). Thymus vulgaris: Alternative to antibiotics in poultry feed. World's Poultry Science Journal, 68(3), 401-408.

[6] Macari, V., Pavlicenco, N., Rotaru, A., & Pirlog, A. (2021). Impact of bior and butofan on some parameters of lipid metabolism in adult quail placed in reconditioning. Animal Science and Food Technology, 12(1), 14-18. doi: 10.31548/animal2021.01.014.

[7] Macari, V., Rudic, V., Pavlicenco, N., Rotaru, A., Putin, V., Alzinati, M., & Enciu, V. (2018). The influence of BioR and butofan remedies on the health and productivity of adult quails under reconditioning. In Microbial Biotechnology (pp. 73-73).

[8] Rudic, V. (2007). Phycobilitechnology-fundamental research and practical achievements. Elena-VI, Chisinau, Republic of Moldova.[In Romanian.].

[9] Rudic, V., & Gudumac, V. (1995). Brevet de inventie 545 G2, MD. Preparat medicamentos. Cererea depusä, 10.

[10] Cherednichenko, O., Bal-Prylypko, L., Paska, M., & Nikolaenko, M. (2021). The expediency of the creation of technology for the production of meat products of long-term storage of the combined structure. *IOP Conference Series: Earth and Environmental Science*, 723(3), 032086). doi: 10.1088/1755-1315/723/3/032086.

[11] Nikolaienko, M., & Bal-Prylypko, L. (2020). Development of an integrated food quality management system. *Potravinarstvo Slovak Journal of Food Sciences*, 14, 862-873. doi:10.5219/1434.

[12] Gad, M., Abdelwahab, K., Abdallah, A., Abdelkhalek, M., & Abdelaziz, M. (2019). Ultrasound-guided erector spinae plane block compared to modified pectoral plane block for modified radical mastectomy operations. Anesthesia, essays and Research, 13(2), 334.

[13] Moon, D.H., Maddahi, J., Silverman, D.H., Glaspy, J.A., Phelps, M.E., & Hoh, C.K. (1998). Accuracy of whole-body fluorine-18-FDG PET for the detection of recurrent or metastatic breast carcinoma. *Journal of Nuclear Medicine*, 39(3), 431-435.

[14] Tanis, P.J., Nieweg, O.E., Olmos, R. A.V., & Kroon, B.B. (2001). Anatomy and physiology of lymphatic drainage of the breast from the perspective of sentinel node biopsy. *Journal of the American College of Surgeons*, 192(3), 399-409.

[15] El-Boghdadly, K., Wolmarans, M., Stengel, A.D., Albrecht, E., Chin, K.J., Elsharkawy, H., ... & Elkassabany, N.M. (2021). Standardizing nomenclature in regional anesthesia: An ASRA-ESRA Delphi consensus study of abdominal wall, paraspinal, and chest wall blocks. *Regional Anesthesia & Pain Medicine*, 46(7), 571-580.

Вплив препаратів BioR та Butofanon на ліпідний обмін дорослих перепелів на відгодівлі

Василе Макарі[1], Наталія Павліченко[1], Ана Ротару[1], Георге Пістоль[1], Михайло Муштрук[2]

[1]Державний аграрний університет Молдови
2049, вул. Мірчешті, 44, Кишинів, Молдова

[2]Національний університет біоресурсів і природокористування України
03041, вул. Героїв Оборони, 15, м. Київ, Україна

Анотація. Враховуючи сучасні тенденції розвитку найбільш розвиненої галузі тваринництва – птахівництва, слід зазначити, що використання екологічно чистих біопрепаратів на основі рослинної сировини є актуально тематикою для дослідження при вирощуванні різних видів птиці, зокрема і перепелів. Метою дослідження є аналіз впливу препарату БіоР виготовленого за оригінальною технології з біомаси ціанобактерій Spirulina platensis на фізіолого-метаболічний статус у груп перепелів, що підлягають відновленню. 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 ß-ліпопротеїнів в сироватці крові на обох етапах дослідження, в той час, як значення холестерину не показали будь-яких істотних змін. Продукт БіоР сприятливо впливає на перепелів, в тому числі на їх ліпідний обмін. Доведено, що за рахунок застосування препарату отримано виражену нормалізуючу дію на ліпідний обмін дослідної групи перепілок, за рахунок зменшення загальних ліпідів, що спричинило незначне підвищення холестерину в крові птахів

Ключові слова: перепели, препарат Біор, ліпідний обмін, фізіологічний сатус, рекондиціонування