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THE IMPACT OF THE BioR REMEDY ON THE MARKER INDICES OF ENDOTOXICOSIS AND HISTIDINE-DIPEPTIDES IN BLOOD SERUM IN QUAILS

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Our goal was the study of the marker indices of endotoxicosis and histidine - dipeptides dynamics in the blood serum of quails treated with the BioR remedy.

The study involved five groups of quails, in the process of reconditioning, (one control group and 4 experimental groups), 40 birds each group. BioR was administered twice: in different doses (0,5-1,5 ml/head of 0,05% BioR sol.), while the control group received saline.

The BioR remedy is well tolerated by adult quails, reduces the necrotic substances level, the average molecular weight substances levels, and induces a truthful histidine - dipeptides level increase, which explains the reduction of the catabolic processes and anabolism enhancement in quails.

Keywords: *BioR remedy, Spirulina platensis, quails, necrotic substances, histidine-dipeptides, average weight substances.*

IMPACTUL REMEDIULUI BioR ASUPRA INDICILOR MARKERI AI ENDOTOXICOZEI ŞI DIPEPTIDELOR HISTIDINICE ÎN SERUL SANGUIN LA PREPELIŢE

Ne-am propus ca scop să urmărim manifestările indicilor markeri ai endotoxicozei şi ai dipeptidelor histidinice în serul sanguin la prepeliţele tratate cu remediul BioR.

Studiul a inclus 5 loturi de prepeliţe, puse la recondiţionare (1 lot martor şi 4 loturi experimentale), a câte 40 păsări. BioR-ul a fost administrat de 2 ori: în doze diferite (0,5-1,5 ml/cap sol. 0,05% BioR), în timp ce la lotul martor s-a administrat ser fiziologic.

Remediul BioR este bine tolerat de prepeliţele adulte, reduce nivelul substanţelor necrotice, al substanţelor cu masă moleculară medie şi induce o creştere veridică a dipeptidelor histidinice, fapt ce demonstrează reducerea proceselor catabolice şi intensificarea anabolismului în organismul prepeliţelor.

Cuvinte-cheie: *remediu BioR, Spirulina platensis, prepeliţe, substanţe necrotice, dipeptide histidinice, substanţe cu masă medie.*

Introduction

Quails, in terms of the volume of production achieved, are incomparable with hens, but are very significant due to the avalanche of investigations in decoding the genome, thus enriching and even confirming the results obtained on hens [15]. Alongside, at the current stage of reviving the livestock sector, of greater importance is pigs, birds, rabbits breeding. Quail breeding is justified by the fact that many people prefer to breed birds both for meat and eggs, products widely required on the today market for their dietary and even curative properties [1,4]. Given the biological specificity of this species, but for other reasons as well, more often are being used biologically active products with adaptive, anti-stress and high growth stimulator properties [9,13]. In aviculture there are used with no doubt growth stimulators, priority being given to the ones of natural origin, harmless and of plant origin [7-10,13]. Part of the biologically active remedies category, ecological, obtained through modern technologies from cyanobacteria *Spirulina platensis* is also the BioR product, nationally and internationally recognized [2,7,18,20,23].

The BioR remedy has been widely studied on laboratory animals, farm animals, and man [3,7,22,25]. Still the impact of this remedy on the marker indices of endotoxicosis and histidine - dipeptides in quails has not been elucidated yet. In this context, the aim of our research was the study of the BioR impact on some parameters of endotoxicosis: average molecular weight substances, necrotic substances and histidine-dipeptides concentration - carnosine in quails reared under factory conditions.

Material and methods

The main task of this study was the assessment of the BioR remedy effects on the serum parameters - average molecular weight substances, necrotic substances and histidine-dipeptides - Carnosine, parameters both related to assessing the state of stress and endotoxicosis detection in adult reconditioned quails. The research material refers to a flock of 200 adult quails of 197 days old, in the period of reconditioning, divided

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into 5 lots,40 birds each, at the end of the laying cycle. The object of the research is the cyanobacterial BioR remedy, administered in different doses to birds from 4 lots, according to the experimental scheme from Table 1.

Tabel 1

BioR 0,05% sol administration scheme in adult quails

Animal lots	Number of birds	Administration regimen	Dose, ml	
			1st administration	2nd administration
Control	40	Twice intramuscular, at the beginning of the study and at the 7th-10th day after the first administration	0,5 ml 0,9% sol. NaCl	0,5 ml 0,9% sol. NaCl
Experimental 1	40		0,25	0,25
Experimental 2	40		0,5	0,5
Experimental 3	40		1,0	1,0
Experimental 4	40		1,5	1,5

The tested remedy is a local product, obtained in the Republic of Moldova from cyanobacteria Spirulina platensis, based on modern biotechnology [21].

The remedy contains a complex of biologically active substances, including carbohydrates, oligopeptides, macro and micro elements, amino acids, especially immunoactive ones, etc.

The quails included in the study were homogenous in terms of body weight and similar regarding physiological conditions and age, staying in the same house where all hygienic and technological parameters: microclimate, hygiene, birds welfare, feeding, watering, and veterinary care were identical. During the study the quails were monitored and examined to assess their number and health status. At the beginning of the study at five quails was randomly measured the body temperature and the number of respiratory movements per minute, and during the research the parameters were evaluated at 5 quails each lot included in the study.

Blood samples were taken at different stages: at the beginning of the study, prior BioR administration, from 5 birds, and then twice: at the first sampling (in the middle of the trial) and at the 2nd sampling, at the end of the study, from 5 quails each lot. The blood was collected by decapitation of quails, in 2 standard tubes – with and without anticoagulant. Average weight substances were estimated using the method described by Нестеров С.Л. et all. [16]. Necrotic substances content was assessed according to the process described by Сыромятникова Е. Д. et all. [17]. Histidine-dipeptides were assessed according to the method elaborated by Северин С.Е. [6].

Statistical evaluation of biochemical indices was performed using Student's t-parameter criteria with the veracity less than 0,05 ($p < 0,05$).

Results and discussion

Data obtained indicate that during the research, over a period of about 40 days, the tested product caused no side effects of the whole body or at the place of administration. It has been noted that in the quails that received the tested product, the body temperature and respiratory movements per minute decreased, by this confirming the adaptive and anti-stress properties of the studied bioremedy, similar results being reported by us in a recently published article [9].

BioR remedy influence on endotoxicosis marker indices and histidine-dipeptides, in adult reconditioned quails, are presented in Table 2.

As shown in Table 2, the mean value of average molecular weight substances at the beginning of the study is 31,45 ± 5,20 u/c, parameter that at the first sampling increased in all groups, but higher in birds from the group control, by 26,2% compared to the beginning of the study. At this research stage the average weight molecules level in all groups treated with BioR was lower by 2,3-15,6% compared to the control group, with significant changes reported in the experimental groups 3 and 4 compared to the control group ($P<0,01$). Similar results have been recorded by other authors who administered organic selenium to broilers [11]. The undertaken study revealed new positive aspects of the BioR remedy impact on the metabolism of adult quails. We underline the fact that at this research stage the BioR product had a positive impact on the internal processes which led to the decrease in serum levels of average weight molecules by 7,9–28,3% compared with the control group, results that reveal the positive effect of the tested remedy for adult quails. We have reported similar results while testing this remedy on broilers [9].

Table 2

Changes of the marker indices of endotoxicosis and histidine–dipeptides in the blood serum of adult reconditioned quails, treated with the BioR remedy

Tested Indices	The beginning of the study	Animal lots				
		Control	LEx 1	LEx 2	LEx 3	LEx 4
AWM, u/c 1st sampling 2nd sampling	31,45±5,20	39,70±0,89 45,93±2,34	38,77±0,44 32,93±6,31	33,49±3,48 42,04±1,13	34,25±1,83* 42,31±0,78	34,32±1,28** 41,15±4,07
NS, u/c 1st sampling 2nd sampling	5,93±0,39	6,18±0,23 6,80±0,30	5,89±0,13 5,16±0,45*	4,90±0,72 5,99±0,45	5,04±0,38* 7,25±0,18	5,18±0,27* 7,85±0,56
HD-Carnosine, mkmol/l 1st sampling 2nd sampling	49,35±1,58	49,51±2,43 53,06±4,36	58,54±6,66 62,13±3,24	55,76±1,26 76,24±9,94	56,04±7,03 64,88±3,08	51,17±1,50 70,96±2,77**

Note: * P <0,05 ** P <0,01; AWM – average weight molecules; NS – Necrotic substances; HD – histidine - dipeptides

Still it is important to underline the fact that some authors who tested certain products enriched with organic selenium didn`t obtain significant results at the end of the technological cycle of broiler rearing, in terms of the average weight molecules serum dynamics [11]. The importance of our results regarding the BioR capacity to reduce the average weight molecules level is validated by some authors` data according to which average weight molecules have neurotoxic effects, inhibit protein biosynthesis, and the activity of several enzymes, disturb the oxidation processes, induce a state of secondary immunosuppression, and have a toxic influence on erythropoiesis [5, p.136-137].

A number of researchers show lower average weight molecules indices in young healthy cattle compared with higher values in case of diarrhoea, considering that the given index could serve as a test of the endogenous intoxication evolution, revealing at the same time the intensity of the catabolic processes. [12]. Similar results were also obtained by other authors who registered higher average weight molecules values in blood serum in children of 0-5 years old, with thermal burns [14], in patients both with hemorrhagic shock, and septic shock [24], thus showing the intensification of the catabolic processes in the body. Necrotic substances (NS) is another marker of endotoxicosis, which values are reported in dynamics in Table 2.

From the analysis of the data presented in this table we can notice that the serum levels of the analysed NS is 5,93 ± 0,39 u/c, parameter which in the control group, at the 1st sampling has a tendency to increase by 4,2% compared to the beginning of the study. On the contrary, according to the data in Table 2, the BioR remedy boosted the decrease of the investigated parameter, in the experimental groups, by 4,7–20,7% compared to the registered values in the control group, at the same time revealing, in the experimental groups 3 and 4, statistically significant differences (P<0,05). Similar results of the NS serum level have obtained and other authors while administrating organic selenium (Sel-Plex) at day 21 of life of broilers, difference that didn`t maintain until the end of the technological cycle, at the 42th day [13].

It is important to reveal the analysis and dynamics of the investigated parameter at the end of the study when persisted a tendency of decrease, in the control group, by 10,0% compared to the previous values of the control group. At the 2nd sampling, the investigated parameter had a specific dynamics, and in strict dependence with the BioR dose administered to broilers. We specify that at the first two experimental groups, treated with lower doses of BioR (0,25-0,5 ml/head), the serum level of analyzed NS remained at a lower level by 11,9–24,1% compared with the control group (P<0,05, experimental group 1). In parallel in the experimental groups 3 and 4, the investigated parameter on the contrary had the tendency to increase by 6,6–15,4% compared to the control group. Therefore, our results confirm the need to conduct detailed studies on optimal dosing of BioR in adult reconditioned quails. The obtained results reveal that the remedy, used in optimal doses, contributes to the improvement of the anabolic processes in adult quails, as reflected by the decrease of the catabolic processes.

The dynamics of both parameters of the biochemical status (catabolic), both in intact and in experimental quails demonstrate that the inclusion of BioR in the treatment schemes of reconditioned quails led to a truthful decrease of the serum levels of average weight molecules and necrotic substances as markers of endotoxicosis and the state of stress in birds, which also had a positive impact on the chickens` welfare.

An important criterion in metabolism assessing, and in particular regarding the anabolic processes, is the serum level of histidine–dipeptides - carnosine, considered as marker of the anabolic processes in the body. According to data in table 2, it is has been noted that, prior the BioR treatment, the histidine – dipeptides - carnosine values constituted in average 49,35 ± 1,58 mkmol/l, maintaining, in the control group, their level the same as recorded at the beginning of the study. The BioR remedy administration induces a tendency of inconclusive increase of histidine–dipeptides by 3,3-18,2% in all experimental groups compared with the reference group, the obtained values depending on the BioR dose administered to quails. At the same time lower doses contribute to a pronounced increase of the investigated index. Similar results were reported by us studying this remedy in broilers [19].

At the end of the study histidine–dipeptides - carnosine values in blood serum increase, in experimental groups treated with BioR, by 17,1–43,7% compared to the control group ($P<0,01$, experimental group 4). According to this, the dynamics of histidine–dipeptides – Carnosine may be explained by the positive intervention of the tested product on the metabolic processes in quails.

Thus, the usage of the BioR remedy in adult reconditioned quails, under physiological conditions, clinically healthy, determines the decrease of the marker indices of endotoxicosis: average molecular weight substances and necrotic substances, and simultaneously the increase of histidine–dipeptides - carnosine in serum, in birds presented in the study.

Conclusions

- The BioR product, obtained through modern technology from Spirulina platensis, tested on adult reconditioned quails, under physiological conditions of poultry factory, for a period of 40 days, is well tolerated by birds and did not cause local or general pathological reactions.
- Under physiological conditions the BioR remedy truthfully reduces the necrotic substances level and contributes to an important decrease in the concentration of average molecular weight substances, which may be the consequence of the catabolic processes decrease in the body.
- The BioR remedy, in adult reconditioned quails, clinically healthy induces a truthful increase of histidine–dipeptides - carnosine in blood serum, which denotes the activation of the anabolic processes in the body.

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