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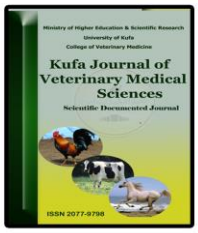

Effect of probiotics “Vetlactoflorum-M” and “Vetlactoflorum-C” on some serum blood biochemical parameters of broiler chickens

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Abstract

The aims of this study were to evaluate effect of using liquid preparation "Vetlactoflorum-M" (dissolved in diluted milk) and "Vetlactoflorum-C" (dissolved in whey) on some parameters such as concentration of cholesterol, triglyceride, glucose and uric acid in blood of broiler chickens. One hundred fifty broilers chicken breed "Ross-308" used in one day old, divided into three groups (each of 50 chicks as follow: (control "un supplemented probiotic ", first treatment group received “Vetlactoflorum-C” and second treatment group received “Vetlactoflorum-M”). Blood samples were taken in 7, 14, 21, 28, 35 and 42 day-old. The results showed that the selected probiotics ("Vetlactoflorum-M" and "Vetlactoflorum-C") are able to reduce uric acid, increase glucose. Lower concentrations of serum cholesterol and triglycerides were observed in the treatment groups. So the results were improved by using probiotic.

Key words: Vetlactoflorum-M, Vetlactoflorum-C, broilers chicken, serum cholesterol, serum triglyceride, serum uric acid .

تأثير المعززين الحيويين " Vetlactoflorum-M " و "Vetlactoflorum-C" على بعض المؤشرات الكيموحيوية لمصل الدم في دجاج اللحم

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الخلاصة:

تهدف هذه الدراسة الى تقييم تأثير اعطاء المعززين الحيويين " Vetlactoflorum-M" (المذاب في الحليب المخفف) و "Vetlactoflorum-C" (المذاب في الشرش) على بعض المؤشرات مثل تركيز الكرليستيرول وثلاثي الكليسيريد والكلوكوز وحامض اليوريك في الدم في دجاج اللحم. اخذت 150 فروج لحم من سلالة "روس-308" في عمر يوم واحد ، وقسمت إلى ثلاث مجموعات كل مجموعة تتكون من 50 فروجة لحم (مجموعة السيطرة لم تعطى المعزز الحيوي) ومجموعة المعالجة الاولى التي اعطيت المعزز الحيوي "Vetlactoflorum-C" ومجموعة المعالجة الثانية التي اعطيت المعزز الحيوي "Vetlactoflorum-M" ". تم أخذ عينات الدم في عمر 7 و 14 و 21 و 28 و 35 و 42 يوما. الدراسة التجريبية اظهرت ان المعززين الحيويين "Vetlactoflorum-C" و" Vetlactoflorum-M" قادران على تقليل حامض اليوريك وزيادة الكلوكوز في مصل الدم. كما لوحظ انخفاض تركيز الكوليستيرول وثلاثي الكليسيريد في مجموعتي المعاملة. من هذه النتائج نستنتج ان اعطاء المعزز الحيوي لا يمتلك تأثير مؤذي على الكلية ويساهم في خفض نسبة الدهون في مصل الدم. .

Introduction:

Recent concerns about the antibiotics resistance in livestock industry indicate the need for alternative strategies to improve animal performance and health without the use of antibiotics. Probiotics are preparations or products with defined and viable microorganisms sufficient to alter the intestinal microflora of the host and exert a beneficial health effect (1). The balance of microflora within the gastrointestinal tract of all animals is important to their digestive process and critical to their overall health. This bacterial population is particularly significant. Probiotics are defined as live microorganisms in fermented foods that promote good health through establishing an improved balance in intestinal microflora (2). Many of researchers defined probiotics as live microbial food supplements, which beneficially influence animals health (3, 4, 5). Their efficiency was demonstrated for the treatment of gastrointestinal disorders, respiratory infections, and allergic symptoms. In most cases, evidence for a beneficial effect was obtained by studies using animal models (6).

Probiotics come under the category of as Generally Recognized as Safe (GRAS) ingredients classified by Food and Drug Administration (FDA). They have no side and residual effects. Probiotics regulates the microbial environment in the gut, reduce digestive upsets and prevent pathogenic gut bacteria, thereby improve live weight gain, improve feed conversion ratio, reduce mortality, increase feed conversion ratio in layers and increase egg production. Limited liability company «**Microbiotic**», city of Vitebsk, Belarus. However, given the preparation has not been studied previously in the broiler chickens. We were the first in Belarus began the study of the preparation in broiler chickens, which was approved by the

result of scientific and technical papers (7, 8, 9, 10).

Vetlactoflorum-liquid preparation of live probiotic acidophilus bacteria strain *Lactobacillus acidophylus* EP 317/402 "Narine" containing 1 cm^3 of not less than 10^7 colony forming units of Lactobacillus.

The aim of this study was to evaluate the effect of supplemented probiotic on some parameters such as concentration of cholesterol, triglyceride, glucose and uric acid in broiler chickens under experimental conditions.

Materials and methods:

Experimental study was conducted by our clinic Epizootology Department, Department of Microbiology and Virology, Veterinary and Sanitary Inspection and laboratory in Scientific Research Institute of Veterinary Medicine and biotechnology/Vitebsk State Academy of Veterinary Medicine.

For laboratory study,150 broiler chicks breed "Ross-308" were used, this chicks divided into three groups 50 broiler chickens in each, acquired by "Vitebsk broiler chickens farm".The broiler chickens were reared under same environmental conditions, they were kept in thermo-neutral hall (approximately from day one old 33^{o}C until final 19^{o}C).

According to the experience chicks one day-old were sorted by gender, 25 chicks' males and females in each group. Feed and water were provided adlibitum.

Throughout the experiment, broiler chickens given probiotic with drinking water according follow:

№ group	**Diet and treatment**
Group 1 (control)	Basic Diet.
Group 2	Basic Diet + probiotic "Vetlactoflorum-M" daily drinking water at a dose of 0.1 ml / bird (1-27day) and 0.2 ml / bird (28-42 days).
Group 3	Basic Diet + probiotic "Vetlactoflorum-C" daily drinking water at a dose of 0.1 ml / bird (1-27day) and 0.2 ml / bird (28-42 days).

Collection of samples, data collection and analysis. At 7, 14, 21, 28, 35 and 42 days of age, 4 ml of blood for laboratory analysis were obtained by axillary vein (with antiseptic) and decapitation, in two different sterile tubes (11, 12). In one of them stabilize blood anticoagulant

Trilon B (disodium EDTA) of 0.1 - 0.2 ml of 10% solution in 10 ml blood, the other was without anticoagulant to obtain serum.

Serum obtained after coagulation at a temperature of (18-20)ºC, then put tubes in centrifuge at 1500 RPM/min for 10-15 minutes to separate the serum. The serum was separated, and then stored at -20°C in order to prepare to measure cholesterol, triglyceride glucose and uric acid.

The levels of triglyceride determined by enzymatic colorimetric method, total cholesterol determined by enzymatic, colorimetric method with with esterase and cholesterol oxidase, glucose determined by fermentative method and uric acid determined by enzymatic, colorimetric method with urease and peroxidase, the values expressed in mmol / l. (11). The results analyzed statistically to find the significant differences among the control and the treated groups by Excel programme.

Results and discussion:

The data represented in Table 1 indicate that in the control group was increasing values in 35 days of life, and subsequently to 42 day indicated decline in cholesterol and triglyceride levels throughout the period of experiment compared with the treatment groups,. In the present study, cholesterol content show decreasing incase of probiotic supplemented groups ($p>0.05$). Onifade *et al.* found supplementation yeast to diet of rabbit and broiler chickens lead to decrease serum cholesterol, triglycerides and phospholipids (13). Also, blood cholesterol levels of layers fed yeast supplemented diets were lowered than the control (14). Similar studies conducted by (15, 16) that found cholesterol content was lowered with inclusion of yeast into broiler chicks diets. In agreement with our results, it is reported that the probiotic supplementation significantly reduces serum lipids (cholesterol and triglycerides) concentrations of the chickens (17,18). In the treatment groups, there is a decrease of these parameters, which are preventing of degenerative changes in the liver. The probiotic supplementation reduce serum cholesterol and triglyceride significantly ($P<0.01$). Our results are supported by those reported by Chafai *et al.* who found a significant difference between treatment and

control groups for serum lipids (P<0.01) (19). In several studies have shown that using of probiotic has the ability to reduce cholesterol in blood (20, 21). Also probiotic supplementation has been shown to reduce the cholesterol concentration in serum in chicken (22) and egg yolk (23, 24). Probiotic bacteria with active bile salt hydrolase or products containing them have been suggested to lower cholesterol levels through interaction with host bile salt metabolism (25).

These because cholesterol synthesis and absorption mainly occurs in the intestines, therefore intestinal microflora have profound effects on lipid metabolism. Last studies had demonstrated that probiotics could improve lipid disorders where it was found that there were lowering blood cholesterol levels and increasing resistance of low-density lipoprotein to oxidation, thus leading to a reduced blood pressure (26). High triglyceride is a consequence of a disturbance of fat metabolism processes which leads to excessive accumulation of triglycerides in the form of lipid droplets in the liver, which it is important characterization of fatty liver (27).

Table 1: Show lipid metabolism of serum in broiler chickens (X±m)

AGE (DAY)	Group	Cholesterol (Mmol/L)	Triglyceride (Mmol/L)
7	1 Control	6,12±0,294	0,58±0,049
	2 Experimental	5,86±0,276	0,6±0,039
	3 Experimental	5,89±0,237	0,59±0,042
14	1 Control	6,42±0,171	0,92±0,044
	2 Experimental	6,09±0,177	0,89±0,022
	3 Experimental	5,80±0,246**	0,98±0,035
21	1 Control	2,85±0,088	0,80±0,207
	2 Experimental	2,41±0,106	0,89±0,176
	3 Experimental	3,09±0,151	0,77±0,116
28	1 Control	3,62±0,191	0,48±0,084
	2 Experimental	3,62±0,300	0,65±0,134

	3 Experimental	3,17±0,403	0,71±0,124
35	1 Control	3,76±0,248	1,57±0,269
	2 Experimental	4,01±0,340	1,48±0,484
	3 Experimental	4,11±0,251	1,21±0,304*
42	1 Control	4,09±0,181	0,76±0,082
	2 Experimental	3,81±0,21=	0,75±0,104
	3 Experimental	3,34±0,101*	0,58±0,065

Means of mark

*Significat different compare with control(P<0.05)

**Significat different compare with control(P<0.01)

***Significat different compare with control (P<0.001)

2nd Group–diluted in milk.

3rd Group–diluted in whey.

Table 2 show concentration of glucose and uric acid in serum of broiler chickens, the level of glucose in the blood of chickens increased in all groups. However, the maximum value of this index was recorded in the third group in 42 day-old. Increasing concentrations of glucose indicates intense absorption of carbohydrates food. Higher blood glucose concentration observed in lambs fed diets supplemented with probiotics might be attributed to more nutrient digestibility resulting in increased precursor availability for gluconeogenesis. However, the results of the present study are not supported by (28) who reported non-significant but slightly lower glucose concentration in lambs fed diets supplemented with probiotics. Whereas it disagrees with (29) who recorded that addition of yeast at a rate of 1, 1.5 and 2 % significantly increase the level of serum glucose in broiler chickens.

In 42-day old, the uric acid in the control group decreased by 69.26%, in the 2nd group by 120.71%, in the 3rd group by 92.97% (P <0.01).

In probiotic received groups, decreased uric acid is in agreement with (30) and (31) findings. Results of this experiment revealed that there was a significant decrease in uric acid level in probiotic groups, indicating beneficial effect of the probiotic on the kidney function. On the other hand, certain probiotic microorganisms can

utilize urea, uric acid and creatinine and other toxins as its nutrients for growth (32).

These results were improved by using probiotic. From these results, we can conclude that probiotic did not induce any harmful effect on kidney and decreased serum lipid.

Table 2: Concentration of glucose and uric acid in serum of broiler chickens (X±m)

AGE (DAY)	Group	Glucose, (Mmol/L)	Uric acid (Mmol/L)
7	1 Control	6,688±1,19	363,14±25,677
	2 Experimental	6,046±0,37	308,79±18,93*
	3 Experimental	6,512±0,39	327,74±13,36*
14	1 Control	5,152±0,594	707,50±77,212
	2 Experimental	6,038±0,327	610,90±31,12
	3 Experimental	5,594±0,771	662,15±27,761
21	1 Control	14,92±1,489	503,88±49,533
	2 Experimental	13,70±0,605	466,76±47,565
	3 Experimental	14,41±0,485	489,78±50,024
28	1 Control	8,89±0,920	671,54±38,369
	2 Experimental	9,23±0,966	635,74±51,423
	3 Experimental	8,66±0,485*	532,26±112,170
35	1 Control	12,69±0,919	294,68±32,279
	2 Experimental	12,51±3,726	315,57±26,170
	3 Experimental	13,04±1,538	337,50±24,680
42	1 Control	13,75±1,278	396,75±18,420
	2 Experimental	11,75±0,412	288,04±29,010
	3 Experimental	16,27±1,595	275,82±15,438**

Means of mark

*Significat different compare with control($P<0.05$)

**Significat different compare with control($P<0.01$)

***Significat different compare with control ($P<0.001$)

2nd Group–diluted in milk.

3rd Group–diluted in whey.

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