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The amino acid composition of broiler chickens meat after oral administration "Danoksan-50"

Abstract. ***In this work we use Liquid chromatography-tandem mass spectrometry (HPLC-MS/MS) method for the determination in red and white broilers muscle essential and nonessential amino acids after the using of "Danoksan-50" at a dose of 0,1 ml/kg. We spotted the ratio in red and white muscle essential and nonessential amino acids, calculation of amino acids score and the biological value of broiler chickens meat.***

Keywords: *essential and nonessential amino acids, amino acids score, biological value of meat, "Danoksan-50", broiler chickens*

Poultry industry in Ukraine gives out 3-4 times more profit than in other areas of agriculture. This causes development of the industry in the field of new technologies and management [1].

Manufacturers have to do unjustified actions in terms of health and welfare for poultry raising profitability. It is the main reason of viral and bacterial diseases. Manufacturers introduce new products to effectively solve this problem. Scientists have to deepen study and analyze new products impact on products slaughter broiler [2].

One of these drugs is "Danoksan-50". Antibiotic used in veterinary medicine for the treatment of respiratory diseases and diseases of the gastrointestinal tract of cattle, pigs and chickens [3].

Determination the ratio in red and white muscle essential and nonessential amino acids, calculation of amino acids score and the biological value of broiler chickens meat after the using of "Danoksan-50" at a dose of 0,1 ml/kg is a priority manufacturers and scientists to ensure the health of the end user.

Objectives of the study. The objective of the study was to determination and ratio in red and white muscle essential and nonessential amino acids, calculation of amino acids score and the biological value of broiler chickens meat after the using of "Danoksan-50" at a dose of 0,1 ml/kg on 24 48, 72, 96 and 120 hours after slaughter.

Materials and methods. The study was conducted at the vivarium of the Research Department of "BIOTESTLAB", at the Ukrainian laboratory of quality and safety of APC and at the National University of Life and Environmental Sciences of Ukraine during September 2015- June 2016.

Materials of research are broiler chickens meat (red and white muscle), laboratory scales, syringes with a volume 2 ml, ethanol 60-70%, table preparation, preparation scissors, packets with lock. Liquid chromatography-tandem mass spectrometry (HPLC-MS/MS) method for the determination of essential and nonessential amino acids was established [4, 5, 6].

Broilers were divided into two groups (experimental and control), 30 fowl in the group of American cross "Cobb-500." Experimental group of broilers were drank the drug "Danoksan-50" at a dose of 0,1 ml/kg body weight for 5 days. Control group of broilers were drank purified water. Broilers were scored 6 birds with each of 24, 48, 72, 96 and 120 hours after the last administration.

When working with animal we used "The European Convention for the Protection of vertebrate animals used for experimental and scientific purposes" [7].

Results. As a result of the research we have found that the content of essential amino-acids in white muscle of research groups increased compared with control groups at 24, 96 and 120 hour after the slaughter and last used of drug "Danoksan-50" on 0,61%, 1, 25% and 0,26% respectively. At the same time essential amino-acids in white muscle of research groups decreased compared with the control on the 48 and 72 hour by 0,03% and 0,51% respectively.

The content of essential amino acids in white muscle in experimental groups compared with control increased by 24 day of slaughter at 4.99%. On the 48 day difference between the content of essential amino acids in the experimental and control group did not reveal, as opposed to the 72, 96 and 120 hours. In this period decreased content of essential amino acids in white muscle in the experimental groups compared with control at 1.25%, 0.11% and 0.21% respectively.

Analysis of amino acid composition in muscles of experimental and control groups shows that drug "Danoksan-50" acts selectively on amino acid metabolism in white muscle of broiler chickens. So "Danoksan-50" improves amino acid metabolism in white muscle of broiler chicks for 24, 96 and 120 hours of slaughter after the last use of antibiotic and reduces by 48 and 72 hours compared to the control groups.

The research found that the content of essential amino-acids in red muscle in experimental groups has increased in comparison with the control at 24, 48, 72, 96 and 120 hour of slaughter after use of fluoroquinolone antibiotic at 6.22%, 3.80%, 4.51%, 5.20% and 0.85% respectively.

The content of essential amino acids in red muscle of experimental groups compared with control groups of broiler chickens increased by 3.72%, 0.76%, 3.62% and 2.30% respectively on 24, 48, 72, 96 hours. While the content of essential amino acids in red muscle of experimental groups compared with the control decreased by 0.39% on 120 hours of slaughter.

Analysis of amino acid composition of red muscle in experimental and control groups shows that the antibiotic improves amino acid metabolism in red muscle of broiler chickens after oral administration for 5 days at a dose of 0.1 ml/kg body weight.

Usefulness of meat proteins determines the ratio of essential amino acids to nonessential amino acids in red and white muscle of broiler chickens. So the ratio of essential amino acids to nonessential amino acids in white muscle in experimental group after use "Danoksan-50" on 24, 48, 72, 96 and 120 hour of slaughter was 0.86; 0.83; 0.83; 0.83; 0.83, respectively. While in the control group, the ratio was 0.82; 0.83; 0.84; 0.84; 0.84.

The ratio of essential amino acids to nonessential amino acids in red muscle in experimental group after use "Danoksan-50" on 24, 48, 72, 96 and 120 hour of slaughter was 0.80; 0.81; 0.80; 0.81 and 0.81, respectively. While in the control group, the ratio was 0.82; 0.84; 0.81; 0.83 and 0.82 respectively.

Analysis of the ratio of essential amino acids to nonessential amino acids in white muscle of broiler chickens demonstrates the increasing usefulness of white muscle fibers in experimental groups compared with control at 24 and 48 hour of slaughter after use the drug by 4. 36% and 0.09% respectively, and further reduce the usefulness of white muscle fibers broiler chickens in the experimental group compared to control by 72.96 and 120 hour slaughter by 0.75%, 1.33% and 0.47% respectively.

The ratio essential amino acids to nonessential amino acids in red muscle of broiler chickens evidenced of reducing the usefulness of red muscle fibers in experimental groups compared with control by 2.35% and 2.93%, 0.85%, 2.76% and 1.22% respectively at 24, 48, 72, 96 and 120 hour of slaughter after the last use of the drug "Danoksan-50".

We determined of amino acids score and biological value of protein for red and white muscle 24, 48, 72, 96 and 120 hour slaughter after the last use of the drug "Danoksan-50" (Table. 1, 2).

Leucine and valine are the limiting amino acids in white muscle in experimental and control groups on 24 hours of slaughter respectively. Valine is the limiting amino acid in white muscle in experimental and control groups by 48, 72 and 120 hour slaughter. Valine and leucine are the limiting amino acids in white muscle in experimental and control groups by 96 hours of slaughter respectively.

We investigated that leucine is the limiting amino acid in red muscle at 24 hours of slaughter and after use the antibiotic in the experimental and control group. Valine is the limiting amino acid at 48, 72 and 120 hour of slaughter in the experimental and control groups. Valine and leucine are limiting ami-

1. Amino acids score of white muscle, %

	24 hour		48 hour		72 hour		96 hour		120 hour	
	experimental group	control group	experimental group	control group	experimental group	control group	experimental group	control group	experimental group	control group
Threonine	42.28	39.73	39.14	40.55	39.14	40.69	39.14	40.54	39.14	40.66
Valine	29.29	27.29	28.24	27.30	28.24	27.29	28.24	28.51	28.24	28.00
Isoleucine	34.39	33.08	34.52	33.81	34.52	33.77	34.52	32.84	34.52	33.78
Leucine	28.92	28.59	28.26	27.94	28.26	28.28	28.26	27.50	28.26	28.22
AAA	51.53	44.92	44.99	46.11	44.99	46.22	44.99	45.53	44.99	45.66
Lysine	42.62	43.20	42.01	43.29	42.01	42.78	42.01	41.66	42.01	42.12
SAA	40.22	37.74	40.12	37.47	40.12	43.43	40.12	43.22	40.12	40.30
Tryptophan	46.09	46.93	46.31	51.44	46.31	48.16	46.31	48.25	46.31	47.46

2. Amino acids score of red muscle, %

	24 hour		48 hour		72 hour		96 hour		120 hour	
	experimental group	control group	experimental group	control group	experimental group	control group	experimental group	control group	experimental group	control group
Threonine	32.18	31.73	32.01	32.01	32.22	31.69	32.55	32.17	31.78	32.21
Valine	25.15	24.12	24.15	23.12	24.37	22.89	24.73	22.29	22.85	22.84
Isoleucine	30.35	27.23	29.96	30.04	29,83	28.79	30.16	28.97	28,70	28.56
Leucine	24.88	23.13	24.49	24.11	24.38	23.74	24.68	23.80	23.48	23.46
AAA	37.21	36.22	36.90	35.01	36.83	35.66	36.88	36.57	35.62	36.02
Lysine	36.16	34.91	36.29	35.24	36.12	34.76	35.79	34.53	35.64	35.32
SAA	32.46	33.67	31.99	35.11	32.90	30.14	32.55	34.27	31.40	31.61
Tryptophan	37.78	41.30	37.35	42.16	40.38	45.04	37.70	42.50	38.48	41.91

no acids at 96 hour of slaughter in the control group and the experimental group respectively.

Analyzing the results of studies found that valine is the limiting amino acid. It is limiting of biological value of protein in red and white muscle, because this amino acid is the lowest in both groups (experimental and control) during the study period.

We determined the quality indicators of protein value of meat (The ratio of tryptophan to oxyproline). The ratio of tryptophan to oxyproline of experimental groups in the white muscle by 24, 48, 72 and 96 hour of slaughter decreased compared to the control groups at 25.00%, 2.35%, 3.45% 3.45% respectively. The ratio of tryptophan to oxyproline was exactly the same by 120 hour of slaughter in experimental and control groups.

The ratio of tryptophan to oxyproline of experimental groups in red muscle decreased compared with control groups to 31.00%, 56.00%, 55. 56%, 33.65% and 31.00% at 24, 48, 72, 96 and 120 hour of slaughter respectively.

Conclusions

1. "Danoksan-50" acts selectively on amino acid metabolism in white muscle of broiler chickens.

2. The content of essential and nonessential amino-acids in red muscle of experimental groups compared with control groups of broiler chickens increased during the study period.

3. Analyzing the results of studies found that valine is the limiting amino acid. It is limiting of biological value of protein in red and white muscle, because this amino acid is the lowest in both groups (experimental and control) during the study period.

4. We determined the quality indicators of protein value of meat (The ratio of tryptophan to oxyproline). The ratio of tryptophan to oxyproline of experimental groups in the white muscle by 24, 48, 72 and 96 hour of slaughter decreased compared to the control groups at 25.00%, 2.35%, 3.45% 3.45% respectively. The ratio of tryptophan to oxyproline was exactly the same by 120 hour of slaughter in experimental and control groups.

5. The ratio of tryptophan to oxyproline of experimental groups in red muscle decreased compared with control groups to 31.00%, 56.00%, 55.56%, 33.65% and 31.00% at 24, 48, 72, 96 and 120 hour of slaughter respectively. ■

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Амінокислотний склад м'яса курчат-бройлерів після перорально застосування препарату «Даноксан-50»

Анотація. ***У цій роботі ми використовували метод рідинної хроматомасспектрометрії для визначення у червоних і білих м'язах курчат-бройлерів замінних і незамінних амінокислот після випоювання препарату «Даноксан-50» у дозі 0,1 мл / кг маси тіла. Розрахували співвідношення замінних і незамінних амінокислот у білих і червоних м'язах, амінокислотний скор та визначили біологічну цінність м'яса курчат-бройлерів.***

Ключові слова: *замінні та незамінні амінокислоти, амінокислотний скор, біологічна цінність м'яса, «Даноксан-50», курчата-бройлери*

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Аминокислотный состав мяса цыплят-бройлеров после перорального применения препарата «Даноксан-50»

Аннотация. ***В этой работе мы использовали метод жидкостной хроматомасспектрометрии для определения в красных и белых мышцах цыплят-бройлеров заменимых и незаменимых аминокислот после выпойки препарата «Даноксан-50» в дозе 0,1 мл/кг массы тела. Рассчитали соотношение заменимых и незаменимых аминокислот в белых и красных мышцах, аминокислотный скор и определили биологическую ценность мяса цыплят-бройлеров.***

Ключевые слова: *заменимые и незаменимые аминокислоты, аминокислотный скор, биологическая ценность мяса, «Даноксан-50», цыплята -бройлеры*

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