

Effect of feeding lysine and methionine on some production performance and blood picture parameter of broiler chickens

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Abstract

The study aims to determine the effect of feeding lysine and methionine on some blood and productivity traits of broiler chickens. Seventy five (Ross breed) birds one day old were been breeding and grouped randomly into three equal groups as follows: T₁ control group, T₂ lysine group, T₃ methionine group. Chicks were housing and feeding for 42 days. Results were show a significant (P <0.05) weekly increase of body weight of lysine and methionine groups (2729.45 g, 2741.25 g) respectively than the control group (2515.20 g), and feed intake (4678.73 g, 4680.03 g) compared with control group (4586.93 g). Also a significant increase in (PCV) (9.53, 9.65%) and the number of red blood cells (2.98, and 3.15 × 10⁶ / ml³) and the concentration of Hb (9.62, 10.01 g / 100 ml of blood) than the control group and there is significant increase in the number of white blood cells. So can give lysine and methionine to increase productivity qualities and blood for poultry.

Key words: methionine, broiler, lysine, amino acid, blood picture.

تأثير التغذية باللايسين والميثونيين على بعض الصفات الدموية والانتاجية لفروج اللحم

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الخلاصة

يهدف البحث الى معرفة تأثير التغذية باللايسين والميثونيين على بعض الصفات الدموية والانتاجية لفروج اللحم. تم تربية 75 طير (سلالة Ross) بعمر يوم واحد قسمت عشوائيا بالتساوي الى ثلاث مجاميع: T₁ مجموعة السيطرة ، T₂ مجموعة اللايسين ، T₃ مجموعة الميثونيين. وتم تربية الافراخ لعمر 45 يوم. اظهرت النتائج زيادة معنوية (P<0.05) اسبوعيا لوزن الجسم ، ووزن الجسم النهائي لمجموعة اللايسين والميثونيين (2629.45غم، 2641.25غم) عن مجموعة السيطرة (2515.20غم) وفي استهلاك العلف (4678.73 غم ، 4680.03غم) مقارنة مع مجموعة السيطرة (4586.93غم). وايضا زيادة معنوية في حجم خلايا الدم المرصوفة (9.53، 9.65%) وعدد كريات الدم الحمراء (2.98 ، 3.15 × 10⁶ / مل³) وتركيز الهيموكلوبين (9.62، 10.01 غم / 100 مل من الدم) عن مجموعة السيطرة و زيادة معنوية في عدد كريات الدم البيضاء. لذا يمكن اعطاء اللايسين والميثونيين لزيادة الصفات الانتاجية والدومية للدواجن. الكلمات المفتاحية: ميثونيين ، فروج اللحم ، لايسين ، احمض امينية ، الصورة الدموية.

Introduction

Amino acids are organic compounds containing the amine and carboxyl group (1). When the proteins digested by enzymes and acids, the final product has an amino acids. amino acids divided in to essential and non-essential amino acids, which all are important physiologically (2). Amino acids necessary that the bird cannot be configured in the body from other amino acids. And the body needs in smaller amounts than, so must its presence in food (3). Lysine and methionine are an essential amino acids, have a

positively charged. Lysine involved in protein biosynthesis, especially in building collagen. It is also involved in protein biosynthesis, its deficiency causes a delay in growth, decrease in the formation of feathers dye and slouch and pounding feathers, affect bone calcification, spermatogenesis, installation of the muscles and tissues of different organs of the body (4). Methionine is one of two sulfur-containing proteinogenic amino acids, and had many effects on the body such as provides body methyl groups

(CH3), can reduce the symptoms of a lack of choline in the body, reduces atherosclerosis in terms of lowering the level of cholesterol in the blood (5), causes the activation of many enzymes involved in the representation of the proteins themselves, added to the diet improves food and egg production efficiency, and prevents increased deposition of fat in the body (6).

Materials and methods

Seventy five (Ross breed) one day old chicks were feed by special feeding program, grouped randomly into three equal groups: T1 control group, T2 lysine group, T3 methionine group, and housed for 42 days (from 1st March to 11th April 2014), to measure some productive performance and some blood picture parameter. The chicks' foods and water were free and housed in cages containing 25 chicks, and the time lighting was 17 h per day and continuous ventilation was provided.

Chicks were weighting weekly throughout the study period. Live body weight measured as (7). Body weight gain was calculated weekly (8). Blood samples were collected from wing vein from eight chicks per group on age 42 days, using blood tube containing (EDTA) an anticoagulant for hematological tests. Packed Cell Volume (PCV) has been

measured by heparinized capillary tubes were filled to 3/4 with blood (9). Red Blood Cells counts (RBC) using solution Natt and Herrick and total white blood cells (TWBC) were estimate according to the methods as reported by (10). Hemoglobin concentration (Hb) was determined by using Darbkin's reagent (11).

The feeding program was the starter and a finisher diet (as below).

Ingredient	Starter (1-21) day	Finisher (22-42) day
Wheat	20	18.3
Yellow Corn	40.1	43.4
Soybean meal	27	23.4
Sunflower Oil	1.8	3.5
calcium Phosphate	0.3	0.5
Protein Concentrate*	10	10
Lysine**	0.2	0.2
methionine**	0.2	0.2
Nacl	0.4	0.5
Total	100	100

* protein produced by Holland company.

**lysine and methionine produced by ADM company.

Statistical analysis:

Data were carried out in a complete randomized design (CRD) using of SAS software (12). The significant differences among means were determined by using (ANOVA) tests and were compared at ($P < 0.05$).

Results

The feed intake of chicks of lysine and methionine groups from the 2nd to the 6th week age were found significantly ($P < 0.05$) higher than those of control group (Table 1). The live body weight was enhanced, all chicks that feeding lysine and methionine had a higher body weight and grew significantly ($P < 0.05$) faster than those of control group (Table 2). Table (3) show the body weight gain was higher in lysine and

methionine groups than those of control group. Accumulative body weight gains were calculated during (2-6) weeks. The effect of lysine and methionine addition on blood picture was show a significant ($P < 0.05$) increase in (Hb), (PCV), total red blood cells count (TRBC) and total white blood cells count (TWBC) in compared to control group (Table 4).

Table (1): Effect of feeding lysine and methionine on feed intake (Mean \pm SE) of broiler chicks.

Treatments Age in week	Feed intake (g\ bird)					
	Week 2	Week 3	Week 4	Week 5	Week 6	Week 2-6 Accumulative
T1	264.81 ^b \pm 1.74	646.25 ^b \pm 1.51	1010.61 ^b \pm 2.52	1240.11 ^b \pm 5.81	1305.16 ^b \pm 9.62	4586.93 ^b \pm 21.25
T2	279.22 ^a \pm 1.29	660.34 ^a \pm 1.22	1059.25 ^a \pm 1.21	1312.07 ^a \pm 5.86	1279.83 ^a \pm 9.17	4678.73 ^a \pm 17.85
T3	278.18 ^a \pm 2.35	657.81 ^a \pm 2.40	1069.34 ^a \pm 2.26	1303.32 ^a \pm 5.83	1284.36 ^a \pm 8.79	4680.03 ^a \pm 20.76

different letters vertically indicate significant difference ($P < 0.05$).

Table (2): Effect of feeding methionine and lysine on live body weight (Mean \pm SE) of broiler chicks

Age in week Treatments	Live body weight(g)				
	Week 2	Week 3	Week 4	Week 5	Week 6
T1	3358.202b \pm 4.51	761.11b \pm 10.40	1306.06b \pm 8.91	2009.08b \pm 5.80	2515.20b \pm 8.60
T2	354.44a \pm 4.12	825.61a \pm 8.82	1419.21a \pm 11.14	2112.43a \pm 11.51	2629.45a \pm 11.00
T3	356.415a \pm 2.30	817.41a \pm 11.61	1421.32a \pm 6.90	2118.33a \pm 8.70	2641.25a \pm 10.12

different letters vertically indicate significant difference ($P < 0.05$).

Table (3): Effect of feeding methionine and lysine on body weight gain (Mean \pm SE) of broiler chick

Treatments Age in week	live body weight gain (g)					
	Week 2	Week 3	Week 4	Week 5	Week 6	Week 2-6 Accumulative
T1	186.21b \pm 4.47	410.91b \pm 5.75	541.90b \pm 1.91	687.02b \pm 3.10	612.90b \pm 2.84	2451.020b \pm 8.51
T2	208.81a \pm 4.32	439.132a \pm 4.76	603.82a \pm 2.23	711.24a \pm 0.32	616.94b \pm 0.48	2568.86a \pm 11.22
T3	208.35a \pm 2.30	440.01a \pm 11.64	603.93a \pm 4.61	709.04a \pm 1.76	628.80a \pm 1.52	2586.35a \pm 9.513

different letters vertically indicate significant difference ($P < 0.05$).

Table (4): Effect of feeding methionine and lysine on blood picture (Mean \pm SE) of broiler chicks

Treatments	Hb (g/100 ml blood)	PCV%	TRBC ($N \times 10^6/ml^3$)	TWBC ($N \times 10^3/ml^3$)
T1	8.70b \pm 0.364	9.47b \pm 0.30	2.47c \pm 0.01	21.25b \pm 0.01
T2	9.68a \pm 0.26	9.565a \pm 0.04	2.96b \pm 0.02	23.22a \pm 0.60
T3	10.05a \pm 0.11	9.66a \pm 0.410	3.18a \pm 0.05	23.23a \pm 0.21

different letters vertically indicate significant difference ($P < 0.05$).

Discussion

The feed intake of chicks in lysine and methionine groups were seen significantly ($P < 0.05$) higher than those of control group from the 2nd week to the 6 week of age. This increase in feed intake may be due to the act of lysine and methionine to increase in metabolism in the body. This result was disagreement with the result by (13) who found that feed intake increased in chicks that were feeding with lysine through 1-8 weeks. All chicks that feeding lysine and methionine had a significant ($P < 0.05$) higher body weight and grew faster than those of control group. This may be due to lysine and methionine as they helps chicks gain weight faster by drawing nutrients from limited feed and still be delivered as quality meat. The studies suggest that amino acids might have a decrease in amino acids degradation and an increase in amino acids synthesis, that yielding increase in growth (14), also lysine and methionine has been investigated for its effects on increasing muscle mass (15). This result was coincided with those reported by (16) whom found an increase in body weight of chicks at 3 weeks of age. Similar result

was reported by (17) in broiler chicks and (18) in Japanese quail chicks. Body weight gain of chicks feeding lysine and methionine were observed higher than those of control group. Accumulative body weight gains were calculated during (2-6) weeks. Those results were agreement with the findings of (18) that reported that chicks which take amino acids, carbohydrates and vitamins led to intestinal enlargement, and development by increasing villus size and capacity of digestion, which led to elevate of digestion and absorption of food. Also the results were in agreement with findings by (17) and (13) who found that lysine and methionine had increased accumulative body weight gain during (1-6 week). The effect of lysine and methionine on blood (Hb), (PCV), (TRBC) and (TWBC) is, significant increase ($P < 0.05$) in Hb of chicks as compared to control group. This increase may be related to the rule of amino acids in construction of Globulins (blood proteins) which was represented as a hemoglobin-building unit (hem proteins) that consists of iron and porphyrin. The feeding with methionine and lysine had increase the

PCV value than control. This increase in PCV because increase in total red blood cells count (19). The same result was finding by (13) who found the PCV has increased in chicks that were feeding lysine or methionine. Results was agreement with those reported by (17) who found that chicks were gave different levels of lysine has elevated PCV. Also we found increased in TRBC of chicks feeding with methionine and lysine as compared to control group. And in methionine group was more than anther treated group. This increase could be related

to the rule of lysine and methionine in producer of blood protein (Globulins). The results of this study were agreement with those reported by (17). TWBC of chicks which feeding methionine and lysine was significantly increased as compared with control. The causes of this increased May be due to increase in immune cells (lymphocyte) these amino acids plays a particularly important role in the immune system (20). This result was agreement with (13) who found increase on WBC of chicks give different levels of lysine.

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