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The Efficacy of Novel Amino Acid Profile on Growth, Economic Efficiency and Carcass Characteristics in Broiler Diet

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Abstract

THIS experiment was applied to evaluate the impacts of novel amino acid profile based on high lysine (Lys) levels and adequate crude protein (CP) with inclusion of sunflower meal on growth, economic efficiency and characteristics of broiler. Three hundred day- old broiler chicks (ROSS 308) were used and classified into six treatments (T1 to T6) in complete random design. There were five replicates of each treatment, each containing 10 chicks. Sunflower meal was included at 5% in all groups except the control (T1). T1 and T2 received diets with the recommended lysine level (100%), while T3 to T6 had increased lysine levels (105%, 110%, 115%, and 120%, respectively). The amino acid profile adjusted according to lysine levels. The results revealed significant improvements in overall performance, BWG and BW increased ($P < 0.05$) significantly from T1 to T6. The highest weight was observed in T6. Feed intake also increased significantly ($P < 0.05$) across treatments, while there were no significant variations in FCR between T2, T3, and T4 in comparison the control. T6 exhibited the best feed efficiency. Additionally, gizzard%, liver%, abdominal fat%, and intestine% increased significantly, with T6 showing the highest values. Economic analysis showed that despite higher costs, T6 offered the best economic efficiency. Overall, the study suggested that a high lysine profile with sunflower meal inclusion improved broiler growth performance, enhanced feed efficiency, and offered economic benefits, made it a viable strategy for poultry production.

Keywords: Broilers; sunflower Meal; lysine; performance; economic.

Introduction

Improvements in nutrition and continuous genetic selection of modern broiler breeds enabled high performance rates, which raised the demand for protein and essential amino acids [1]. To meet the rising global demand for poultry meat with minimal environmental impact, it is essential to develop strategies that enhance the sustainability of poultry production [2]. The recommendations of the NRC 1994 for protein and EAA are not suitable to satisfy the needs of new broiler strains for optimal growth. Therefore, synthetic amino acids in pure form are used in broiler diets to promote growth [3].

Soybean meal, a common source of protein in chicken diet, is favoured due to its substantial level of protein (44-48%) and its ability to meet the bird's amino acid requirements, except for methionine. Additionally, soybean meal has a high digestibility factor, making it a reliable choice for poultry feed [4]. However, the increasing global demand for soybean meal has driven up its prices, prompting researchers to explore alternative local protein sources, such as sunflower meal (SFM) which is a by-product derived from the extraction of sunflower oil, is cheaper and can replace part of soybean meal in poultry feed, helping to reduce feed costs, which constitute a large portion of production expenses [5]. Sunflower meal is a sustainable protein source with high fiber content and lower lysine (1.70%) compared to soybean meal, making lysine supplementation necessary to optimize growth [6, 7].

Lysine is a critical amino acid for broiler growth, particularly in the first few weeks of life [8]. It is essential for muscular growth, protein synthesis, immunological response, and cytokine production [9-11]. Being the second most restricted amino acid for growth in feed based on soybean meal and maize, after the primary restricted amino acid methionine, lysine is the is most researched amino acid in broiler nutrition [12]. The optimum lysine requirement is crucial for both economic and performance reasons [13, 14], as deficiencies or excesses can negatively impact growth and feed efficiency [15, 16]. Lysine has attained significant importance in the

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demonstration of essential AA requirements due to its ratio, which is the basis of the ideal protein concept [13], and diet formulation that depends on an ideal protein concept being an effective approach to enhancing nitrogen utilization and minimizing nitrogen excretion.

The aim of this trail was to determine the effect of novel amino acid profile with increasing dietary Lysine content above the breeder recommended level in addition inclusion of alternative protein source as sunflower meal then examining their impacts on growth, economic efficiency, and carcass features in broilers.

Material and Methods

Experimental design and housing

Three hundred day old broiler chicks (Ross 308) were weighed at the beginning of the experiment, and again after each phase: starter (1-10 days), grower (11-24 days), and finisher (25-35 days). In a complete random system, the chicks were classed into 6 groups, each with 5 replicate of ten birds. Six treatments (T1-T6) were formulated, with T1 serving as the control. Sunflower meal was included in all groups at 5%, except for the control (T1). Both the control group (T1) and the second group (T2) provided with diet contain standard Lysine level (100%). In the third group (T3), the content of Lysine was elevated by 5% above the level recommended, by 10% in the fourth group (T4), by 15% in the fifth group (T5), and by 20% in the sixth group (T6). The temperature was monitored during the trail. The chicks were grown under the same sanitation, management, and environmental circumstances. Standard health protocols, including vaccinations for Newcastle disease (on days 4 and 14) and Gumboro disease (on days 7 and 22), were followed. The diets were designed based on the recommended nutritional needs of the breed, based on the Ross 308 management guide (2022), as shown in Tables {1}, {2}, and {3}.

Growth Parameters

The initial body weight (IBW) of each individual bird was estimated on the first day of birth, and the average BW of each treatment was recorded at the final day. IBW (W1) was subtracted from the final BW (W2) to determine body weight gain (BWG). The variance between the weight of the feed supplied and the amount of feed left over was known as feed intake (FI). By dividing FI by BWG, the FCR (feed conversion ratio) was calculated [17].

Carcass traits

At the last day of the trail, the birds were fasted of food for the night but were provided with water. Weighing the birds before slaughter and after allowed us to detect their bled and live weight. Abdominal fat, liver, spleen, bursa, intestine, heart, and gizzard were all weighed and recorded as a % of the live body weight. Dressing weight / living weight × 100% used to get the dressing percentage.

Economic parameters

Various economic efficiency indicators were estimated, [18- 20], notably total cost, total return, net profit, and variable expenses. Additionally, the performance index (PI) was determined [21]. The total cost per bird comprised feed, litter, veterinary services, one-day-old chicks, electricity, labor, and others. Total costs equal total fixed costs plus total variable costs. Total Returns (TR) equals litter sales plus broiler sales. Litter sale equal litter sale price divided by the number of broilers at the last day of the trial. Broiler sales are calculated by multiplying body weight/gm at the conclusion of the project by the Gram price. Net profit is total returns minus total costs. Efficiency percentage is calculated as net profit divided by total cost multiplied by 100.The performance index is calculated as BW (kg) / FCR * 100.

Statistical analysis

The data were analyzed using SPSS version 25 (Armonk, NY: IBM Corp). Results were presented as Mean ± SE. The data were screened, and the Shapiro-Wilk test was applied to assess normality. Levene's test was also performed to evaluate the homogeneity of variance. For variables that violated the homogeneity assumption, Welch's ANOVA was used. One-way ANOVA was applied for data meeting the assumption of homogeneity to test differences among groups. Significant results were followed by Tukey's Honest Significant Difference test. $P < 0.05$ was considered statistically significant.

Results

Performance

As shown in Table (4), the broiler performance improved progressively from T1 to T6. The BWG and BW of T1 were the lowest and were considerably ($P < 0.05$) lower than those of the other treatments. BWG and BW increased ($P \leq 0.05$) significantly from T1 to T6, with T6 achieving the highest BW, outperforming all other groups. FI also increased significantly ($P \leq 0.05$) from T1 to T6, with T6 having the highest FI, while the control group had the lowest. FCR improved from T1 to T6, with T6 having the best FCR (1.46). FCR differences between T2, T3, and T4 were not statistically significant in comparison with the control, but T5 and T6 had significantly ($P \leq 0.05$) better FCRs. Overall, increasing high lysine levels with 120% with 5% SFM demonstrated the best growth performance, with the highest BW, optimal FI, and best FCR.

Carcass characteristics

As demonstrated in Table (5), the live body weight increased ($P \leq 0.05$) significantly from T1 (1756. 67 g) to T6 (2303.33 g), with a clear upward trend as lysine levels increased. The liver % increased ($P \leq 0.05$) significantly from T1 (1.82%) to T6 (2.73%). gizzard% showed a high Significant result ($P \leq 0.05$) with T6 showing the highest result (2.58%). High significant results ($P \leq 0.05$) in intestine% were recorded, with T6 having the highest value (8.89%), followed by T5 (8.67%). There was a high significant result in the percentage of abdominal fat ($P < 0.05$), with T6 (1.13%) having the highest value. Significant differences in heart percentage were observed, with T6 showing the highest value (0.54%). Non-significant differences were recorded across the treatments for Bursa% and spleen%.

Economic efficiency

The net profit, total return, and total cost showed high significant values ($P < 0.05$) from T1 to T6, as indicated in Table (6). The performance index increased ($P \leq 0.05$) significantly across diets; with T6 having the highest index provided the best combination of growth and profitability.

Discussion

Broiler feed has recently been developed basically on digestible amino acid to satisfy the requirement of recent broilers, who require higher lysine during their first 2 to 4 weeks of life [8]. To meet the growing global demand for poultry meat while reducing its negative environmental effects, strategies are needed to increase the sustainability of this industry [2].

Our study determines the impact of novel amino acid profile on broiler growth. The results demonstrated a progressive increase in BW and BWG as lysine levels increased. This finding aligned with the study found that adding lysine (NRC + 0.15percent, NRC + 0.3percent) improves weight gain and feed efficiency more than the NRC (1994) recommended levels [3]. Additionally, agreed with studies suggesting that lysine plays a crucial role in protein synthesis and muscular growth, leading to increased body weight [8].

Furthermore, it was found that a 10–30% replacement soybean meal with sunflower meal had no impact on the broilers BW, However, a higher percentage of replacement was related with a significant decline ($p \leq 0.05$) [6, 22]. In contrast, other studies found that substitution soybean meal with sunflower meal (5–20%) did not influence broiler performance [23, 24]. These findings support using of sunflower meal in broiler diets as an effective protein source.

Regarding feed intake, it increased gradually with higher lysine levels. This increase can be explained by improved dietary quality, as faster growth (facilitated by lysine) often requires increased feed intake to meet the elevated energy and protein demands [25]. Furthermore, broilers tend to increase their feed intake when provided with nutrient-dense diets, as seen in the current study. A significant improvement in feed conversion ratio was observed with increasing lysine levels. This improvement indicates that lysine enhances the efficiency of feed utilization, converting it into body weight more effectively.

More studies revealed that increasing lysine levels above NRC recommendations improves FCR and overall growth performance [26- 30]. Other showed that excessive lysine supplementation (above 120%) may reduce protein efficiency [3]. Overall, the study demonstrates that higher lysine levels, particularly in combination with sunflower meal, improve broiler growth, feed intake, and feed efficiency.

Our study showed improvements in broiler growth and carcass yield. Specifically, the higher % of liver, intestine, gizzard, and abdominal fat, indicate enhanced digestive and metabolic processing. This aligns with studies that show dietary lysine plays a crucial role in promoting organ growth and function, especially in the liver, which is responsible for protein and fat metabolism [31]. The gizzard, which is responsible for feed digestion, also showed an increase, likely due to better feed utilization associated with higher lysine availability [25]. Similarly, the increased intestinal percentage can be attributed to improved nutrient absorption, as higher lysine levels stimulate digestive efficiency [32].

According to economic efficiency, there was a significant increase total cost, total return, and net profit as the lysine levels increased from T1 to T6. The performance index, which reflects the balance between growth and profitability, also showed a marked improvement across the diets, with T6 exhibiting the highest index. This suggests that higher lysine levels provide the best overall combination of growth performance and profitability. These findings aligned with previous studies by [33, 34], who reported that birds receiving lysine supplementation above 1.3% had lower production costs per kilogram of live weight. Other study showed that adding lysine to low-protein diets improved economic efficiency in broiler production [35].

Conclusion

These studies underscore the effect of lysine supplementation to enhance both the performance and economic outcomes of broiler farming. Although lysine positively impacted growth parameters, the fact that the results of economic efficiency did not differ significantly implies that other variables, such feed prices or particular production circumstances, might affect the total economic value of lysine supplementation. Overall, while high-cost diets can lead to higher returns and profits, the decision on diet selection should take into account not only cost but also the potential for increased growth and market demand for the final product.

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Declaration of Conflict of Interest

The authors declare that there is no conflict of interest.

Ethical of approval

The Animal Welfare and Research Ethics Committee approved the experiment (permission number: ZU-IACUC/2/F/8/2025).

TABLE 1. composition and chemical analysis of the experimental diets during the starter period.

Ingredients%	Experimental diets					
	Control	100% Lysine	105% Lysine	110% lysine	115% lysine	120% Lysine
Yellow corn	52.42	50.51	50.60	50.08	50.42	51.06
Soybean meal, 46%	34.15	30.00	30.45	31.97	31.95	31.40
Sunflower meal	0.00	5.00	5.00	5.00	5.00	5.00
Corn gluten, 60%	5.03	5.51	4.52	2.86	2.19	1.84
Soybean oil	3.00	3.70	3.79	4.15	4.13	3.99
Calcium carbonate	0.37	0.54	0.54	0.53	0.53	0.53
Calcium dipasic phosphate	2.95	2.61	2.62	2.62	2.63	2.63
Common salt	0.30	0.30	0.30	0.30	0.30	0.30
Sodium bicarbonate	0.25	0.25	0.25	0.25	0.25	0.25
Premix (muvco)	0.30	0.30	0.30	0.30	0.30	0.30
L-Lysine HCL, 78%	0.41	0.47	0.56	0.61	0.70	0.80
DL-Methioinine, 98%	0.33	0.31	0.38	0.45	0.52	0.58
L-Threonine, 98.5%	0.13	0.14	0.19	0.25	0.30	0.36
L-Valine, 96.5%	0.02	0.02	0.09	0.16	0.23	0.30
L-Arginine, 95%	0.09	0.09	0.17	0.23	0.31	0.41
Choline chloride, 60%	0.10	0.10	0.10	0.10	0.10	0.10
Antimycotoxin	0.10	0.10	0.10	0.10	0.10	0.10
Anticoccidial	0.05	0.05	0.05	0.05	0.05	0.05
Chemical analysis %						
ME (kcal/kg diet)	2975	2975	2975	2975	2975	2975
Crude protein	23	23	23	23	23	23
Calcium	0.95	0.95	0.95	0.95	0.95	0.95
Available Phosphrus	0.5	0.5	0.5	0.5	0.5	0.5
D. Lysine HCL	1.32	1.32	1.39	1.45	1.52	1.58
D. Methioinine	0.66	0.66	0.72	0.78	0.83	0.89
D. Threonine	0.88	0.88	0.92	0.97	1.01	1.06
D. Methionine + cystiene	1	1	1.04	1.1	1.15	1.2
D-Valine	1	1	1.05	1.1	1.15	1.2
D-Arginine	1.4	1.4	1.47	1.54	1.61	1.68

TABLE 2. Composition and chemical analysis of the experimental diets during the Growing period.

Ingredients %	Experimental diets					
	Control	100% Lysine	105% Lysine	110% lysine	115% lysine	120% Lysine
Yellow corn	55.78	52.45	52.90	53.41	54.34	54.27
Soybean meal, 46%	31.94	30.86	30.47	30.06	28.99	29.64
Sunflower meal	0.00	5.00	5.00	5.00	5.00	5.00
Corn gluten, 60%	4.15	2.59	2.33	2.00	2.00	1.00
Soybean oil	3.63	4.97	4.86	4.75	4.48	4.63
Calcium carbonate	0.30	0.32	0.32	0.32	0.32	0.31
Calcium dipasic phosphate	2.40	2.05	2.06	2.06	2.07	2.08
Common salt	0.30	0.30	0.30	0.30	0.30	0.30
Sodium bicarbonate	0.25	0.25	0.25	0.25	0.25	0.25
Premix (muvco)	0.30	0.30	0.30	0.30	0.30	0.30
L-Lysine HCL, 78%	0.30	0.30	0.39	0.48	0.59	0.66
DL-Methioinine, 98%	0.28	0.28	0.34	0.39	0.45	0.51
L-Threonine, 98.5%	0.08	0.08	0.13	0.18	0.24	0.29

Ingredients %	Experimental diets					
	Control	100% Lysine	105% Lysine	110% lysine	115% lysine	120% Lysine
L-Valine, 96.5%	0.00	0.00	0.05	0.10	0.17	0.23
L-Arginine, 95%	0.03	0.00	0.05	0.14	0.24	0.30
Choline chloride, 60%	0.10	0.10	0.10	0.10	0.10	0.10
Antimycotoxin	0.10	0.10	0.10	0.10	0.10	0.10
Anticoccidial	0.05	0.05	0.05	0.05	0.05	0.05
Chemical analysis %						
ME (kcal/kg diet	3050	3050	3050	3050	3050	3050
Crude protein	21.5	21.5	21.5	21.5	21.5	21.5
Calcium	0.8	0.75	0.75	0.75	0.75	0.75
Available Phosphrus	0.42	0.42	0.42	0.42	0.42	0.42
D. Lysine HCL	1.18	1.18	1.24	1.3	1.36	1.42
D. Methioinine	0.6	0.6	0.66	0.7	0.76	0.8
D. Threonine	0.79	0.79	0.83	0.87	0.91	0.95
D. Methionine + cystiene	0.92	0.92	0.97	1.01	1.06	1.1
D-Valine	0.93	0.93	0.96	1	1.05	1.09
D-Arginine	1.27	1.3	1.33	1.4	1.46	1.52

TABLE 3. Composition and chemical analysis of the experimental diets during the Finisher period.

Ingredients,%	Experimental diets					
	Control	100% Lysine	105% Lysine	110% lysine	115% lysine	120% Lysine
Yellow corn	62.61	58.84	58.92	59.09	60.20	59.84
Soybean meal, 46%	25.93	25.42	25.80	25.94	24.52	25.65
Sunflower meal	0.00	5.00	5.00	5.00	5.00	5.00
Corn gluten, 60%	4.33	2.47	1.64	1.00	1.27	0.00
Soybean oil	3.00	4.51	4.59	4.61	4.26	4.52
Calcium carbonate	0.25	0.31	0.30	0.30	0.30	0.30
Calcium dipasic phosphate	2.00	1.65	1.66	1.66	1.67	1.67
Common salt	0.30	0.30	0.30	0.30	0.30	0.30
Sodium bicarbonate	0.25	0.25	0.25	0.25	0.25	0.25
Premix (muvco)	0.30	0.30	0.30	0.30	0.30	0.30
L-Lysine HCL, 78%	0.35	0.33	0.39	0.47	0.57	0.63
DL-Methioinine, 98%	0.26	0.26	0.32	0.38	0.43	0.49
L-Threonine, 98.5%	0.08	0.08	0.13	0.17	0.23	0.26
L-Valine, 96.5%	0.00	0.00	0.06	0.11	0.18	0.23
L-Arginine, 95%	0.09	0.02	0.09	0.16	0.26	0.30
Choline chloride, 60%	0.10	0.10	0.10	0.10	0.10	0.10
Antimycotoxin	0.10	0.10	0.10	0.10	0.10	0.10
Anticoccidial	0.05	0.05	0.05	0.05	0.05	0.05
Chemical analysis %						
ME (kcal/kg diet	3100	3100	3100	3100	3100	3100
Crude protein	19.5	19.5	19.5	19.5	19.5	19.5
Calcium	0.69	0.65	0.65	0.65	0.65	0.65
Available Phosphrus	0.36	0.36	0.36	0.36	0.36	0.36
D. Lysine HCL	1.08	1.08	1.13	1.19	1.24	1.3
D. Methioinine	0.56	0.56	0.61	0.67	0.71	0.76
D. Threonine	0.72	0.72	0.76	0.79	0.83	0.86
D. Methionine + cystiene	0.86	0.86	0.9	0.95	0.99	1.03
D-Valine	0.84	0.84	0.88	0.92	0.97	1.01
D-Arginine	1.17	1.17	1.23	1.29	1.35	1.4

TABLE 4. growth parameters of broilers fed experimental diets (mean ± SE)

Traits	Diets +groups					
	Control (T1)	100% Lysine (T2)	105% Lysine (T3)	110% Lysine (T4)	115% Lysine (T5)	120% Lysine (T6)
Final BW (g)	1901.25 ±4.5^{d}	1984.75 ±49.48^{cd}	2082.5 ±14.6^{bc}	2151 ±20.19^{b}	2183 ±15.9^{b}	2302.5 ±18.52^{a}
BWG (g)	1857.67 ±4.46^{d}	1941.3 ±49.37^{cd}	2038.8 ±14.7^{bc}	2107.4 ±20.14^{b}	2139.75 ±15.88^{b}	2259.05 ±18.61^{a}
FI (g)	2964.05 ±26.32^{c}	3008.85 ±86.32^{bc}	3165.1 ±17.02^{abc}	3248.2 ±46.81^{a}	3235.55 ±63.8^{ab}	3299.65 ±29.72^{a}
FCR	1.60 ±.01^{a}	1.55 ±.01^{ab}	1.55 ±.01^{ab}	1.54 ±.01^{ab}	1.51 ±.02^{bc}	1.46 ±.02^{c}

a, b, c, d Tukey's Honesty significant difference test indicates that means in the same row with different superscripts are statistically different at P<0.05.

TABLE 5. Carcass traits of broilers fed diets with novel amino acid profile (mean ± SE)

Traits	Diets +groups					
	Control (T1)	100% Lysine (T2)	105% Lysine (T3)	110% Lysine (T4)	115% Lysine (T5)	120% Lysine (T6)
Live BW (g)	1756.67 ±102.69^{b}	1840 ±17.32^{b}	1966.67 ±36.32^{ab}	1980 ±10^{ab}	2050 ±40.41^{ab}	2303.33 ±129.91^{a}
Dressing%	71.81 ±1.41	78.80 ±4.88	72.28 ±1.15	69.59 ±2.08	75.50 ±.1.20	70.52 ±.1.87
Liver%	1.82 ±0.08^{c}	1.97 ±0.03^{bc}	2.23 ±0.04^{abc}	2.37 ±0.09^{abc}	2.47 ±0.17^{ab}	2.73 ±0.24^{a}
Gizzard%	1.93 ±0.16^{b}	2.03 ±0.17^{ab}	2.07 ±0.12^{ab}	2.36 ±0.04^{ab}	2.17 ±0.13^{ab}	2.58 ±0.12^{a}
Intestine%	6.81 ±0.38^{b}	8.15 ±0.20^{ab}	7.65 ±0.09^{ab}	7.75 ±0.15^{ab}	8.67 ±0.39^{a}	8.89 ±0.63^{a}
Spleen%	0.19 ±0.01	0.18 ±0.02	0.18 ±0.01	0.15 ±0.002	0.20 ±0.004	0.17 ±0.02
Heart%	0.55 ±0.02^{a}	0.40 ±0.01^{c}	0.42 ±0.04^{bc}	0.47 ±0.01^{abc}	0.49 ±0.04^{abc}	0.54 ±0.02^{ab}
Abdominal fat%	0.77 ±0.09^{b}	0.72 ±0.04^{b}	0.80 ±0.05^{b}	0.81 ±0.07^{b}	0.87 ±0.05^{ab}	1.13 ±0.07^{a}
Bursa%	0.21 ±0.02	0.25 ±0.02	0.20 ±0.03	0.19 ±0.05	0.22 ±0.02	0.24 ±0.04

a, b, c, d Tukey's Honesty significant difference test indicates that means in the same row with different superscripts are statistically different at P<0.05.

TABLE 6. Economic efficiency of broilers broilers fed diets with novel amino acid profile (mean ± SE)

Traits	diets +groups					
	Control (T1)	100% Lysine (T2)	105% Lysine (T3)	110% Lysine (T4)	115% Lysine (T5)	120% Lysine (T6)
Final body weight (kg)	1.90 ± 0.005^{d}	1.98 ± 0.05^{cd}	2.08 ± 0.01^{bc}	2.15 ± 0.02^{b}	2.18 ± 0.02^{b}	2.30 ± 0.02^{a}
Total costs (L.E)	92.31 ± 0.64^{d}	93.63 ± 2.11^{d}	99.77 ± 0.43^{c}	104.28 ± 1.21^{bc}	106.74 ± 1.71^{ab}	110.85 ± 0.82^{a}
Total return (L.E)	173.11 ± 0.4^{d}	180.63 ± 4.45^{cd}	189.43 ± 1.31^{bc}	195.59 ± 1.82^{b}	198.49 ± 1.43^{b}	209.23 ± 1.67^{a}
Net profit (L.E)	80.80 ± 0.65^{c}	86.99 ± 2.43^{bc}	89.66 ± 1.15^{b}	91.31 ± 0.81^{b}	91.76 ± 0.4^{b}	98.38 ± 2.12^{a}
Economic efficiency (%)	87.55 ± 1.23	92.90 ± 1.00	89.87 ± 1.14	87.58 ± 0.85	86.04 ± 1.68	88.79 ± 2.39
Performance index (%)	119.18 ± 1.05^{e}	128.07 ± 2.95^{de}	134.16 ± 1.65^{cd}	139.57 ± 1.07^{bc}	144.45 ± 0.83^{b}	157.73 ± 3.35^{a}

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تأثير ملف حمضى أمينى جديد على الأداء وصفات الذبيحة والكفاءة الاقتصادية في علف دجاج التسمين

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الملخص

تهدف هذه الدراسة إلى تقييم تأثير ملف الأحماض الأمينية الجديد بناءً على مستويات عالية من الليسين وبروتين خام كاف مع وجبة عباد الشمس على الأداء وصفات الذبيحة والكفاءة الاقتصادية لدجاج التسمين. تم استخدام 300 كتكوت من سلالة روس 308 بعمر يوم واحد وتم تقسيمهم إلى ست مجموعات تجريبية من T1 إلى T6 بتصميم عشوائي كامل. شملت كل مجموعة خمس تكرارات تحتوي كل منها على عشرة دجاجات. تم اضافة وجبة عباد الشمس بنسبة 5% في جميع المجموعات باستثناء المجموعة الضابطة (T1) . المجموعات T1 و T2تلقت أنظمة غذائية تحتوي على مستوى الليسين الموصى به (100%)، بينما المجموعات من T3 إلى T6 تحتوي على مستويات مرتفعة من الليسين (105%، 110%، 115%، و120% على التوالي). تم تعديل ملف الأحماض الأمينية وفقًا لمستويات الليسين. أظهرت النتائج تحسنًا كبيرًا في الأداء العام، حيث الزيادة في الوزن بشكل كبير من T1 إلى T6. تم ملاحظة أعلى وزن في T6. كما زاد استهلاك العلف بشكل كبير عبر المعاملات، بينما لم تظهر نسبة تحويل العلف فروقًا ذات دلالة إحصائية بين T2 و T3و T4مقارنةً بالضابطة. أظهرت المجموعة T6 أفضل كفاءة في استخدام العلف. بالإضافة إلى ذلك، زادت النسب المئوية للكبد والمعدة والأمعاء والدهن البطني بشكل كبير، حيث أظهرت T6 أعلى القيم. أظهر التحليل الاقتصادي أنه على الرغم من التكاليف المرتفعة، فإن T6 قدمت أفضل كفاءة اقتصادية. بشكل عام، تشير الدراسة إلى أن تحسين ملف الليسين مع تضمين وجبة عباد الشمس يمكن أن يعزز أداء الدواجن في النمو، ويحسن كفاءة العلف، ويوفر فوائد اقتصادية، مما يجعله استراتيجية قابلة للتطبيق في إنتاج الدواجن.

الكلمات الرئيسية: دجاج التسمين، وجبة عباد الشمس، الليسين، الأداء، الاقتصاد.