

Replacement Value of Lysine and Methionine for Super Concentrate in Broiler Chick's Yield and Quality

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ABSTRACT: The effect of dietary lysine and methionine supplementation on the growth performance and carcass characteristics of one hundred twenty five, day –old broiler chicks were studied .Five experimental diets A,B,C,D and E were formulated with increasing levels of lysine and methionine without using a super concentrate except in diet E in which super concentrate was used (A=1.2%lys +0.49%met ,B=1.31 %lys +0.56%met ,C=1.4 %lys+0.6% met ,D=1.54 % lys+0.62 % met and E 1.5 % lys +0.62 %met)

The results showed that with increasing levels of lysine and methionine, a significant ($p<0.05$) improvement in feed intake ,average body weight gain and feed conversion ratio (FCR)was observed ,in the two test groups C and D containing subsequent increasing levels of lysine and methionine compared to the control group A containing no super concentrate. All test groups showed non-significant ($p>0.05$) effects on non-carcass components, commercial cuts, meat yield and the average subjective meat quality scores compared with diet A.

KEYWORDS: dietary lysine and methionine, commercial cuts, subjective meat quality scores.

INTRODUCTION

In the Sudan, imported super concentrate was provided to suffice for essential amino acids and other micro-nutrients which consequently increase the total cost of poultry feed.

Some previous studies (Omer,2001) showed a significant difference in the weight gain in an experiment in which lysine and methionine replaced poultry super concentrate .Fritts et al.,(2001) found an improvement in the growth rate due to adequate and higher available amino acids .

The present study was conducted to compare the feeding value of super concentrate with synthetic lysine and methionine and their effect on the yield and quality of broiler chicks.

MATERIALS AND METHODS

One hundred twenty five day-old broiler chicks of the Ross 308 type were used chicks after a week of adaptation .Chicks were randomly assigned to five treatment groups, each of which was subdivided into five replicates with five chicks each .Five experimental diets A, B, C, D and E were formulated in

order to support the nutrient requirement of birds . Lysine and methionine, were supplemented at increasing levels without using the broiler super concentrate, except in diet E. (Table1).Feeding was continued for 7 weeks.

Performance parameters recorded were body weight, weight gain, feed intake, feed conversion ratio mortality and carcass evaluation .At the end of the experiment; birds were individually weighed after an overnight fast (except for water)and then slaughtered ,scaled and washed. Birds were eviscerated and parts and organs, head, legs, total viscera, liver, gizzard and heart were individually weighed. Carcasses were chilled and 4° for 24 hours before dissection. Carcass cuts thigh, drumstick and breast of the left side were separated and individually weighed. Each cut was deboned and the meat and bone were weighed separately. Meat of each cut was stored for chemical analysis and later organoleptic panel test.

The data collected were subjected to one way ANOVA, and the Duncan's Multiple Range test was used to compare means (Duncan, 1955).

Table1: Percent formula (fresh basis), calculated and analyzed chemical composition (dry matter basis of experimental diets)

	A	B	C	D	E
Dura	64.00	64.14	64.14	64.14	64.14
Groundnut meal	17.30	17.17	17.00	17.00	14.00
Sesame meal	14.53	14.74	14.74	14.09	15.00
Super concentrate*	0.00	0.00	0.00	0.00	5.00
Oyster shell	0.90	0.49	0.49	1.00	0.49
Salt	0.25	0.25	0.25	0.25	0.25
DCP.	2.05	2.06	2.06	2.06	0.62

DL-met.97%	0.16	0.23	0.27	0.30	0.16
L-lys.99%	0.61	0.72	0.85	0.96	0.34
Vit.and minerals	0.20	0.20	0.20	0.20	0.00
Calculated chemical composition					
ME	3077.67	3084.74	3085.80	3062.06	3105.21
Lysine	1.20	1.31	1.44	1.54	1.50
Methionine	0.49	0.56	0.60	0.62	0.62
Calcium	1.26	1.11	1.11	1.28	1.15
Phosphorus.	0.80	0.80	0.80	0.80	0.76
Crude protein	22.05	22.10	22.11	21.75	22.82
Fiber	4.41	4.41	4.41	4.34	4.13
Chemical Composition					
Dry matter	94.65	93.71	94.20	95.10	94.62
Ash	7.30	6.45	6.81	7.65	7.40
CP	21.80	22.40	21.90	21.60	22.00
Ether extract	6.34	6.20	5.50	6.01	5.85

*Supper concentrate (LNB): CP 40%.: "ME 2000kcal/kg, Ca=8- Lysine=12% -Methionine=3% -Phos. total=8%Vit 12500iu -VitD3 2500iu- Vit E 25mg/kg- Vit C 4000 mg/kg- VitB1 20 mg/kg- VitB2 100 mg/kg- - VitB12 300 mcg/kg -Vit .k3 60 mg/kg -Iron 800 mg/kg-Folic acid 30 mg/kg- Choline 10000 mcg/kg- VitB640 mg/kg -Biotine Mcg/kg

RESULTS

The addition of the two limiting amino acids Lysine and methionine in the synthetic form to broiler diet A, B, C and D containing no super concentrate resulted in a successive increase in feed intake throughout the experimental period and this increase was significant at high level of inclusion of these amino acids. The average body weight and body weight gain showed more or less similar trend to that for feed intake and feed conversion ratio.

Birds fed on diet E were significantly higher than other groups in body weight and body weight gain. Also birds fed on diets D and C were significantly higher compared to group A in all parameters.

Feed conversion ratio for birds feed on diet D recorded better (p>0.05) than other groups followed by group E, C,B while A is the lowest. The addition of synthetic amino acids had no significant (p<0.05) effect on the mortality percentage (Table2).

Results showed on significant(p>0.05) difference in average weights of body components (Table 3) .The values of meat from commercial cuts were inconsistent in the trend of increase or decrease compared to the control, but means remains similar (p>0.05),(Table4).There were no significant(p>0.05) difference between treatments in panel test values (table5).

Table2: Average performance values of experimental broiler chicks.

Item	A	B	C	D	SE+	F-value	SE+
Final body weight (g)	857.29a	905.00 a	1144.29b	1230.86b	70.19	14.39	70.19
Av. body wt. gain (g)	739.93 a	791.13 a	1069.44b	1190.21b	60.78	24.4	60.78
Av. Feed intake (g)	2534.97 a	2572.75a	3038.18b	3252.73b	105.53	6.78	105.53
Feed conversion (g feed/g wt.)	3.45 a	3.27 a	2.85b	2.60b	0.15	5.88	0.15
Mortality (%)	3.00	0.00	1.50	4.50	0.00	-	0.00

All average are similar (p>0.05).

Table 3: Average values of non-carcass components as percentage of final body Weight of experimental broiler chicks.

Item	Heart	Liver	Gizzard	Head	Legs
Treatment					
A	1.42	4.62	2.27	5.29	7.84
B	1.50	5.04	2.48	5.09	7.10
C	1.11	4.66	2.22	4.66	7.30
D	1.35	4.46	2.59	4.48	7.19
E	1.01	3.54	2.27	4.49	7.37
SE+	0.12	0.33	0.20	0.40	0.50
F-value	3.22	9,61	0,66	0,95	0,36

All average are similar (p>0.05).

Table 4: Average percent values of carcass cuts and tissues percent values of each cut of experimental broiler chicks.

	A	B	C	D	E	SEM+-
Hot carcass weight	854.00	872.00	1082.00	1282.00	1052.00	73.64
Breast %	11.70	12.10	12.79	15.91	19.76	0.73
Meat%	79.59	80.63	81.63	83.02	81.63	3.42
Bone %	19.81	19.3	17.93	16.78	17.93	1.98
Drumstick	6.46	7.72	8.03	8.41	10.76	1.54
Meat%	78.01	80.32	78.28	80.56	81.35	1.13
Bone %	20.99	19.06	21.72	19.42	18.12	1.14
Thigh	8.31	7.10	5.65	6.06	9.06	1.02
Meat%	72.14	71.23	77.23	78.03	77.78	2.9
Bone %	24.52	27.85	22.75	22.33	22.33	2.99

All averages are similar (p>0.05)

Table 5: Average subjective meat quality scores of experimental broiler chicks.

Item Group	Tenderness	Flavour	Color	Juiciness
A	6.00	6.12	5.81	5.78
B	6.01	6.24	5.93	5.80
C	6.04	6.22	5.91	5.82
D	6.02	6.18	5.90	5.80
E	6.05	6.23	5.89	5.91

All average are similar (p>0.05).

DISCUSSION

Fritts et al., (2001) reported that the improvement in growth rate of broiler may have arisen mainly from adequate and higher available amino acids. Latshaw (1981) reported that nutritionally adequate diet should be formulated according to amino acids content rather than crude protein level.

Chicks fed on diet D gain 161.0% and consumed 1.3% as much as the diet A. This better growth rate of broiler confirm the findings of Omer (2001) who reported that DL-methionine and L-lysine when used without a super concentrate, differ significantly in weight gain. Results obtained in this research indicated that chicks fed on diet D attained the best feed conversion compared to other test groups, these results were in line with the findings of Elam in and Elzubeir (1989), who found better feed conversion with the increase of dietary lysine level and also confirming Garlic (1985) results, who observed better feed conversion with methionine supplement.

Non carcass components, meat chemical composition values and subjective meat quality scores (colour, tenderness juiciness and flavour) were not affected significantly with the different levels of lysine and methionine supplemented. These results were confirming the findings of Mohamed (1997) and Elshoori (2004) whom reported that these parameters are not affected by the dietary concentration. Product composition is more related to the genetic characteristics rather than environmental changes including feeding.

The mortality rate remained low (0.0-4.5%) although the study period. This consent rate. To the findings of

Omer (2001) who reported that the addition of synthetic amino acids had no effect on the mortality.

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