Protein Requirement of Medium Egg-type Chick In Hot Arid Conditions.

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SUMMARY

An experiment was conducted to determine protein requirement of Medium egg-type chick during the starting growing period. Average daily temperature was 33ºC with 30 relative humidity. Three diets based on sorghum grains with protein supplements made of fish meal, sesame and peanut meals were formulated to contain 18, 20 and 22% crude protein. All diets had similar amino acids and ME content (2850 Keal/kg).

Chick fed 18% protein diet consumed more feed than the other two groups ($P<0.05$). There was no difference in body weight gain and feed conversion ratio between treatments. Feed intake was 1594. 1569 and 1561 g/bird whereas average body weight was 376, 377 and 391 g/bird for the three diets respectively.

In second experiment, three diets containing 15, 17 and 19% CP were fed from 6-14 weeks of age. All diets were similar in amino acids content and (2850 kcal/kg). Feed consumption and average body weight at 14 weeks of age for the three groups were 5077, 5072 and 5062 g/bird, 1043, 973 and 972 g/bird respectively. Suggested protein requirements are 18 and 15% CP for 0-6 and 6-14 weeks of age respectively.

INTRODUCTION

Commercial poultry production depend totally on exotic breeds from temperate zone but as expected the performance of exotic breeds under local conditions is lower than found in temperate zones. Several factors are known to limit the performance of temperate birds.

One of the major problems, which limit the poultry production in Sudan, is nutrition. It is known that the principles of the nutrition are basically similar irrespective of the climate; however some special consideration may apply in optimizing nutrition in warm climate in tropical environment. Both decreasing and increasing protein level may have detrimental effect on performance of growing chicks. Therefore, the advisability of using various protein levels in this study to determine the protein requirements of medium egg-type chick during 0-6 weeks and 6-14 weeks of age respectively.

This basic information is required to augment our knowledge on performance of these temperate birds under Sudan Conditions.

MATERIALS AND METHODS

In the first experiment 225 day-old female commercial chicks (Hisex brown) were selected on basis of uniform starting live body weight (32 g/chick). They were classified into three groups at Wad- Medani poultry house from 0-6 weeks of age.

In this experiment, each diet was fed to three replicates of 25 chicks. Chicks also were vaccinated against Gumboro and Newcastle disease. Records were kept for feed consumption, body weight changes and feed conversion ratios.

The composition and chemical analysis of three experimental diets A, B and C are shown in Table **(1).** The three diets A, B and C are formulated to contain various protein levels 22, 20 and 18% respectively. All birds in this experiment were allowed to receive isocaloric diets with the same levels of essential amino acids (EAA).

In second experiment, 225 female chicks of six weeks of age (Hisex brown) fed already on control starter diet were selected carefully for state of health and uniform starting body weights (365 g/birds). They were reared in the same poultry house from 6-14 weeks of age.

In the present experiment, each diet was fed to the three replicates of 25 birds. Birds also vaccinated against a Fowl pox disease and received prophylaxis doses of antibiotics, coccidiostats and supportive doses of vitamins + minerals in drinking water. Records were kept for feed intake, weight gain and feed conversion ratio. Also records were kept for maximum and minimum degrees of temperatures and mortality. The composition and chemical analysis are shown in Table **(2)** respectively.

The experimental diets were formulated to contain various protein levels. 17, 19 and 15% respectively. All birds were allowed to received isoenergetic diets with same pattern of recommended N.R.C. (1984) level of essential amino acids (EAA). The experimental design for both experiments was based on Completely Randomized Design (CRD). The data of experiment was analyzed by analysis of variance.

Table 1. Composition of the experimental diets (%)

Ingredients	D I e t s A	B	C
Sorghum	58.93	57.25	60
Wheat bran	13	5.2	19.18
Sesame meal	14.15	14.3	6.5
Groundnut meal	5.1	14	9
Superconcentrate	-	-	5
Fish meal	4	4	-
Alfa Alfa	1.8	2.26	-
Bone meal	1.01	1.15	-
Oyster shell	1.01	0.84	0.32
Salt	0.5	0.5	-
Vitamins + minerals premixes	0.5	0.5	-
Total			

Chemical analysis of experimental diets			
Crude protein % (Nx6.25)	20.06	22.08	18
Metabolizable energy (ME Kcal/kg)	2866	2859	2850
Lysine %	0.85	0.85	0.85
Methionine %	0.36	0.40	0.30
Meth. + Cystine %	0.69	0.71	0.60
Calcium %	1	1	1
Av. Phosphorus %	0.4	0.4	0.4

Table 2. Composition of the experimental diets (%)

Ingredients	Diets		
	A	B	C
Sorghum	50	57.52	65.5
Wheat bran	21	18.4	24.9
Sesame meal	8.1	11.5	1
Groundnut meal	3	4.2	3.5
Superconcentrate	-	-	5
Fish meal	4	4	-
Alfa Alfa	1.11	1.65	-
Bone meal	0.5	0.5	-
Oyster shell	1.29	1.23	0.1
Salt	0.5	0.5	-
Vitamins + minerals premixes	0.5	0.5	-
Total			

Chemical analysis of experimental diets			
Crude protein % (Nx6.25)	17	19	15
Metabolizable energy (ME Kcal/kg)	2855	2861	2850
Lysine %	0.60	0.60	0.60
Methionine %	0.32	0.36	0.25
Meth. + Cystine %	0.59	0.65	0.50
Calcium %	1	1	1
Available Phosphorus %	0.35	0.35	0.35

RESULTS

The performance data for experimental groups are shown in Table **(3)** and **(4)** respectively. It is obvious from the data in Table **(3)** and **(4)** no great difference (P>0.05) was existed among tested groups in both experiments in term of feed consumption, weight gain and feed conversion ratio. It is evident from the results obtained that increasing protein level above optimum level 18 and 15% CP did not improve the performance of the birds.

Exp. No. (1)

Table 3. Average feed intake, weight gain and feed conversion ratio for experimental groups A, B and C during 0-6 weeks. (Values are average g/bird) ± SE (Standard error).

	A	B	C	SE	LS
Feed intake (g/bird/6 weeks)	1549	1569	1561	2.20	N.S.
Weight gain (g/bird/6 weeks)	340	344	363	2.48	N.S.
Feed conversion ratio	4.55	4.56	4.29	0.16	N.S

LS : Level of significance.
NS : Not statistically significant.

Exp. No. (2).

Table 4. Average feed intake, weight gain and feed conversion ratio for growing layer chick during 6-14 weeks. (Values are average g/bird) ± SE (Standard error).

	A	B	C	SE	LS
Feed intake (g/bird/14 weeks)	5072	5065	5077	5.97	N.S.
Weight gain (g/bird/14 weeks)	626	608	707	6.17	N.S.
Feed conversion ratio	8.08	8.32	7.18	0.72	N.S

LS : Level of significance.
NS : Not statistically significant.

DISCUSSION

It is obvious in this study that each level of protein above 18% and 15% CP respectively. (First and Second experiment) was not necessary to improve performance data because it considered optimum for starting growing chicks. These results are in general agreement with previous report by Smith (1966).

The possible explanation for the better performance for group fed 18 and 15% CP in both experiments was accounted to the better quality protein supplement (superconcentrate) rather than high protein levels in both other diets. Also it is important to point here the efficiency of protein improved at low protein level. Previously in 1949, Singsen demonstrated that the efficiency of protein decreased at high protein level. In other words each added increment of protein level above optimum levels (18 and 15% CP) produce smaller return in feed intake weight gain and feed conversion ratio. The results obtained are demonstrated by Askelson and Ballon in 1965.

In conclusion, the data obtained here indicated that the protein requirement for starting growing chick, can be simplified to 18% and 15% CP respectively in both periods without decreasing growth rate.

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متطلبات البروتين للكتاكيت البياض للنوع متوسط الحجم
في الظروف الجافة الحارة

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ملخص البحث:

هذه التجربة تقود إلى تحديد متطلبات البروتين بالنسبة للكتاكيت متوسطة الحجم خلال فترة النمو . متوسط الحرارة اليومية 33° مئوية والرطوبة النسبية 30% .

ثلاثه علائق (وجبات) مكونة من حبوب الذره مع البروتين المدعم مركب من وجبة السمك والسمسم والفول لتتكون من 18 ، 20 و22% بروتين . كل العلائق (الوجبات) تحتوي مستويات متشابهة من الأحماض الأمينية الأساسية والطاقة (2850 كيلوكري/ كيلوجرام).

الكتاكيت التي تغذت علي نسبة 18% بروتين استهلكت علف أكثر من المجموعتين الأخريين ($P<0.05$) . لا يوجد أي اختلاف بالنسبة لوزن الجسم ومعامل التحويل الغذائي .

بالنسبة للمعاملتين معدل استهلاك الغذاء كان 1594 ، 1569 و1561 جرام لكل طائر بينما كان متوسط وزن الجسم 376 ، 377 و391 جرام لكل طائر .

في التجربة الثانية ثلاثه علائق (وجبات) تحتوي علي 15 ، 17 و19% بروتين غذيت خلال الفترة من 6– 14 أسبوع من العمر . كل العلائق (الوجبات) كانت متشابهة في الأحماض الأمينية الأساسية والطاقة .

استهلاك العلف ومتوسط وزن الجسم عند 14 أسبوعآ للثلاثه مجموعات كانت 5077 ، 5072 و5062 جرام / طائر و 1043 ، 973 و972 جرام / طائر علي التوالي.