

The Effect of Dietary Protein level and age on the performance and Carcass Composition of Broiler Chickens in Yemen Arab Republic  
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This study has been carried out to investigate the effect of dietary protein level and age on broiler performance and Carcass composition under condition of Tohama region, Yemen Arab Republic. Results obtained can be summarized as follows :

Increasing the protein level in the broiler rations from 22 % to 24 % increased the final body weight at 8 weeks of age ( about 230 grams per bird). Daily feed consumption decreased when the protein level increased, while the efficiency of feed utilization was generally less when the protein level decreased. Mortality rate was slightly higher when the protein increased.

Protein level and age of birds affected significantly the live weight and gizzard percentage, while the liver percentage was affected only by age . No significant effect was obtained due to protein levels or age of birds on blood loss, fat liver percentages and dressing percentage at an experimental period.

Tohama region of Yemen Arab Republic is recognized with extremely hot weather and high relative humidity all the year round. In spite of this

unfavourable weather for keeping broiler chickens in open farms. So many breeders endeavoured to improve the poultry production and enhance the adaptability of birds to varying environmental conditions. Huston et al. (1957), and Ahmed et al. (1967) studies the effect of genetic differences between breeds and individuals. They found that white Leghorn are more heat tolerant than other commercial breeds. Also, many reports showed that high environmental temperature has an adverse effect on growth performance.

Selim and Hsiang (1978) found that the hot environmental conditions during summer months has and adverse effect on growth rate of chicks. The differences in live weight for tested broiler strains between Summer and Winter months were highly significant. Also, there was a significant difference in efficiency of feed utilization between Summer and Winter experiments.

Some studies have also show the effect of dietary protein level on body weight gain and efficiency of feed utilization. El-Boushy et al. (1979) found that body weight, growth and feed conversion of broilers at four of seven weeks of age were affected by a difference in protein levels ranging from 19 to 23 % Also, El-Moghazy et al. (1982) reported that there was a significant gradual increase in average live weight according to the increase of crude protein. Olomu and Offiong (1980) found that for starting chickens, maximum weight gains, feed efficiency and lowest feed cost per kilogram live weight gain were obtained on the rations containing 23 or 26 % protein. For finishing broiler chickens, dietary protein level did not have any significant effect on weight gains.

Many studies were carried out on the effect of protein level on the dressing percentages of

different parts and organs of broiler chickens. NeWell and Shaffner (1950), reported that blood loss during the hase of killing broilers was about 4 percent of the live body weight. While Amer (1970) reported that the percentages of blood, feather, liver, dressing carcass, gizzard out heart of Fayoumi hens were not influenced by feeding different levels of protein. Finally, Edwards et al. (1973) indicated that the quantity of feathers on the carcass increased with age. The present study was designed to investigate the effect of dietary protein and age on the performance and carcass composition of commercial broiler strain in Yemen Arab Republic.

#### Material and Methods

Two similarly designed experiments were conducted at Sardoud Agriculture Institute, Tohama Region, Yemen, Arab Republic. The first experiment was done for broiler production in open farms in this area. The first and second experiments were done during November and December months, 1982. One day old hybro commercial broiler chicks were imported from Holland and used in these experiments. Six hundred chicks divided randomly into two groups each group contained 300 chicks. They were placed in an open floor house system. The house is partitioned into 2 pens with a wooden wall, and each pen measured 2.5 m. width and 6 m. length. Each group was treated as a brooding unit during the first two weeks of age . Then, from 2 weeks up to the end of the experiment, chicks of each group were divided randomly into 2 equal groups as replicates of 150 chicks. The chicks in the first treatment were fed on a commercial broiler ration from one day old till 8 weeks of age. The broiler ration contained 3100 k cal M.E./kg. diet and about 22 % crude prontein. It was composed for 60 % ground yellow corn, 24 % soybean meal ( 49 % crude protein ),

5 % Alfalfa meal, 3 % fish meal, 2 % meal meal, 3 % animal fat, 1.3 Di calcium phosphate, 1.5 % premixes and 0.2 % sodium chloride. The chicks in second treatment were fed on a diet containing 15 % of a previous broiler ration and 5 % fish meal (65.5% c.p.) Feed and wate were available ad libitum. Body weights; feed consumption, feed conversion (feed/gain) were calculated and mortality rate were recorded weekly throughout the experimental period (8 weeks of age) At 6,7 and 8 weeks of age, 3 birds were taken randomly from each treatment in order to determine the effect of dietary protein level on carcass composition. Feeding was stopped from birds 24 hours before slaughter then the birds were weighed to the nearest gram. Records were kept for the percentages of blood loss, feathers, unedible parts, gizzed, liver, heart and dressing carcass. The data were subjected to the analysis of variance as discribed by Snedecor and Cochran (1978), using the appropriate analysis of least significant differences ( L.S.D.).

### Results and Discussion

#### Average live weight :

The average values of weekly live weight of the different experimental groups are given in Table (1) and illustrated in Fig. (1) . Comparing the data of growth of the first experiment to the second experiment, it could be noticed from table (1) that higher values of live weight were obtained in Expt. 2 than in Expt. 1. Chicks of Expt. 2 at 8 weeks of age gained 230 grams per bird more than Expt. 1. Gain of chicks at Expt. 2 was 12.7 % higher than gain obtained in Expt. 1. Also, data in table (1) showed that the increase of live weights of two experiments values at different stages of growth. These results are in agreement with those reported by El-Boushy et al. (1979) who found that body

weight, growth and feed conversion of broiler at four and seven weeks of age were affected by a differences in protein level ranging from 19 to 23%. This also has been proved by El-Moghazy et al. (1982) While selim and Hsiang (1978) found that the mean values of live weight of Hypro broiler strain were 273.1, 749.0, 1365.8 and 1988.4 grams at 2, 4, 6 and 8 weeks of age, respectively.

#### Feed consumption :

The average daily feed consumption per chick ( weekly ) is calculated and represented in table (1). It is well illustrated that chicks in the two experiments ate more feed as they grew older. The average daily feed consumption for during the whole experimental period was 72.1 and 65.6 grams for birds received a diet containing 22 and 24 % crude protein in there diets, respectively. Consumption with first group was 9.9 higher than with second group. Similar results were obtained by Selim and Hsiang (1978) who found that the average daily feed consumption during the whole experimental period was 79.8 grams for Hypro strain chicks. Also, data in table (1) showed that the feed consumption for group 2 which received a diet containing 24 % crude protein was lower than the first group which received diet with 22 % crude protein. The same conclusion has been reported by El-Boushy et al. (1979).

#### Feed conversion :

Table (1) shows daily gain and accumulatetive feed conversion ( kgs. of feed per kg. of gain ) for tested groups weekly until 8 weeks of age. It is indicated that the efficiency of feed utilization decreases with the advance of age ranging from 2.07 and 1.23 at one week to 2.14 and 1.68 kgs. at 8 weeks old for group 1 and group 2, respectively. Also, data in the

same table indicated that the efficiency of feed utilization was generally less in Expt. (1) than in Expt. (2) . This might be the cause of lower daily feed consumption and higher daily gain for group (2) than group (1) .

#### **Mortality rate :**

As shown in table (1) , the mortality rate of day old chicks up to 8 weeks of age did not exceed 7 % for tested broiler chicks with both experiments. Mortality rate was slightly higher (4 %) with group 1. The high mortality with birds of Expt. 2. It may be due to the increase in protein level and to heat stress especially if we know that they were exposed to a temperature reached to 34° C and relative humidity of 88 % during this period.

#### **Slaughter tests :**

##### **Body weight :**

The average values of body weight of the different levels of protein are given in Table (2) . The average body weight were found to be 1606 and 1818 grams for groups 1 and 2, respectively. Differences between body weight obtained in two groups were highly significant. These results are in agreement with those reported by Abdel-Hakim et al. (1982) who found that the increasing in the protein levels in the diets, increased the final body weights.

Irrespective of protein level, the average values of body weight were found to be 1473, 1688 and 1976 grams at 6, 7 and 8 weeks of age, respectively (Table 3). Differences in body weight values among age were highly significant (  $P < 0.01$  ).

##### **Blood loss and feather percentage :**

As shown in table (2), the dietary protein level showed no significant affect on the percentage

Table (1): Average values of some properties of broiler strain as affected by dietary protein and age of chickens.

Age in weeks	Live weights g.		Daily feed consumption g.		Daily gain		Accumulative feed conversion		Mortality rate %	
	1	2	1	2	1	2	1	2	1	2
1	128	135	25	16	12.1	13.0	2.07	1.23	0.67	1.0
2	240	270	31	25	16.0	19.3	2.01	1.27	0.67	1.01
3	425	490	50	42	26.4	31.4	1.97	1.29	0.68	1.02
4	635	780	70	64	30.0	41.4	2.06	1.36	0.68	1.03
5	915	1090	81	78	40.0	44.3	2.05	1.44	0.68	1.04
6	1230	1500	97	89	45.0	58.6	2.07	1.45	0.69	0.70
7	1565	1815	104	101	47.9	45.0	2.08	1.56	0.69	0.71
8	1890	2120	119	110	46.4	43.6	2.14	1.68	0.69	0.71
0-8	230		72.1	65.6	32.98	37.08	2.14	1.68	5.45	7.22

Table (2): Effect of dietary protein levels on body weight, different parts and organs percentages of broiler chickens.

Items Treatment	Body weight gms.	Blood- loss %	Feather %	Liver %	Gizzard %	Heart %	Dressing carcass %
Diet 1.	1606**	3.96	6.83	2.23	2.33**	0.51	66.40
Diet 2.	1818**	4.21	6.57	2.07	2.00**	0.49	65.91
Average	1712	4.085	6.70	2.15	2.17	0.50	66.16
F. value	16.6	2.64	0.94	3.0	17.14	0.31	0.68

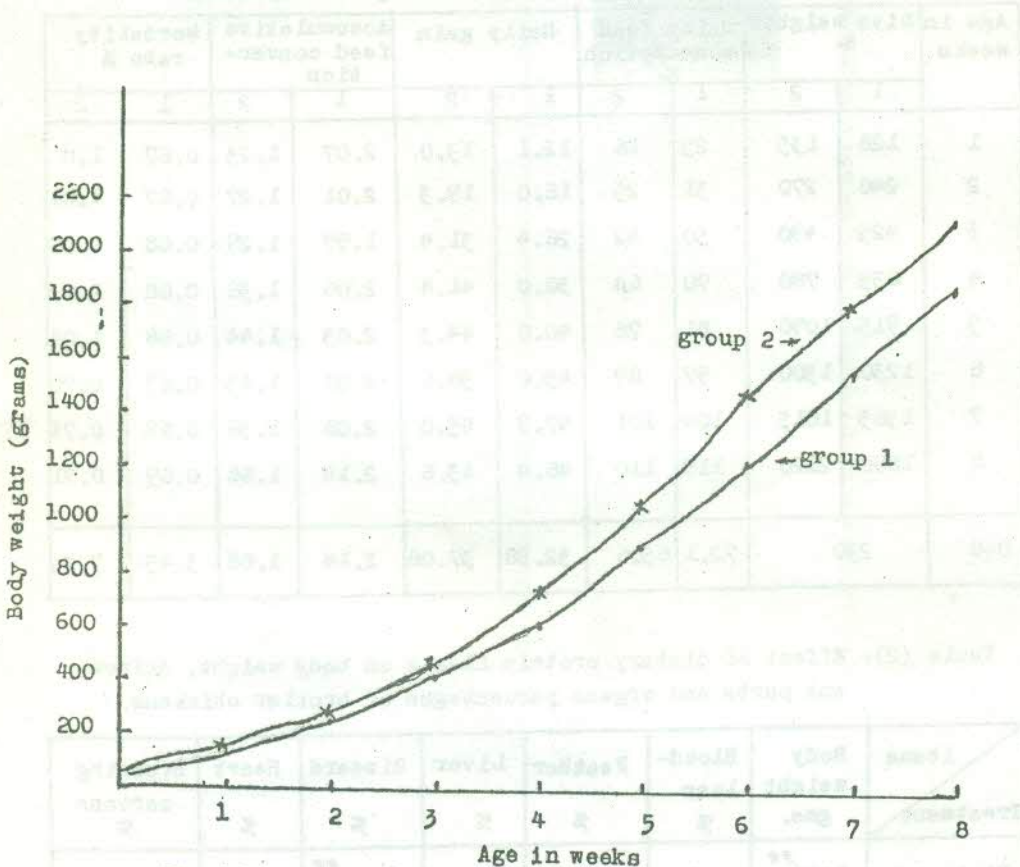


Fig. (1): Effect of dietary protein levels on live body weight.



of blood loss.

Table (3): Effect of age on body weight, different parts and organs percentages of broiler chickens.

Items Age in weeks	Body weight gms.	Blood-loss %	Feather %	Liver %	Gizzard %	Heart %	Dressing carcass %
6	1473 <sup>a</sup>	4.12	6.94	2.36 <sup>+</sup>	2.36 <sup>a</sup>	0.53	63.83 <sup>a</sup>
7	1688 <sup>b</sup>	3.95	6.50	2.12 <sup>+</sup>	2.24 <sup>ac</sup>	0.50	65.47 <sup>b</sup>
8	1976 <sup>c</sup>	4.19	6.65	1.97 <sup>+</sup>	1.90 <sup>b</sup>	0.46	69.17 <sup>c</sup>
Average	1712	4.085	6.70	2.15	2.17	0.50	66.16
F. values	31.5	0.86	0.88	6.0	12.14	1.01	30.70

results are in agreement with those reported by Amer, (1970) and Abdel-Hakim et al. (1982) who found that the protein level and source did not show any significant effect on the percentage of blood loss. Irrespective of the protein level, the age of birds had no significant the effect on blood loss percentage (Table 3). Changes in protein levels in diets of broiler chickens showed insignificant effect on the percentage of feather (Table 2). The same conclusion has been reported by Abdel-Hakim

et al. (1982). Results shown in table (3) indicated that there were no significant differences in the feather percentage due to ages of birds. These results are not in agreement with those reported by Edward et al. (1973) who indicated that the quantity of feathers on the carcass increased with age. Liver, Gizzard and Heart percentages :

Data in Table (2) demonstrate no significant effect due to protein level on liver and heart percentages. These results are in agreement with those obtained by Amer (1970) who reported that the percentages of liver, gizzard and heart of Fayoumi hens were not influenced by feeding different levels of protein. The data in table (2) also indicate that the percentage of gizzard decreased significantly (  $P < 0.01$  ) with the increase of dietary protein level in broiler rations. This might be the cause of increase of daily feed consumption in group 1 which received diet containing 22 % crude protein than group 2 which received a diet containing 24 % C.P. Table (3) showed that the liver percentage decreased significantly (  $P < 0.05$  ) with advanced age of chicks. This is to be expected due to the relative increase of body weight of birds with advanced ages. While the percentage of gizzard weight was decreased with advanced age. These differences statistically were highly significant (  $P < 0.01$  ). The same table (3) showed that there were no significant differences in the heart percentage due to the advanced age.

#### **Dressing percentage :**

In general it may be noticed that dressing percentages were not influenced by protein levels in the rations. Analysis of variance indicated that there were no significant differences in the dressing carcass percentage due to feeding different levels

of protein table (2). The same results had been found by Amer (1970).

It could be observed that dressing percentage increased significantly ( $P < 0.01$ ) with advanced age ( table 3 ). This may be attributed to the relative higher of the carcass weight with the advanced age of broiler chickens. In general, production performance and carcass characteristics of broiler strain under climatic conditions of Yemen Arab Republic gave good results according to this study.

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تأثير مستوى البروتين فى العلائق وعمر الطيور على السلوك الانتاجى  
و مكونات الذبيحة فى دجاج بدارى المائدة تحت الظروف البيئية  
فى الجمهورية العربية اليمنية

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العربية \*

أجريت هذه الدراسة لبيان تأثير التغذية على مستويين من البروتين الخام  
( ٢٢ ، ٢٤ %) وكذلك عمر الطيور على السلوك الانتاجى وخواص الذبيحة تحت ظروف  
البيئة الطبيعية لمنطقة تهامه بالجمهورية العربية اليمنية . استخدم فى هذه  
الدراسة ٦٠٠ كتكوت من سلالة هيبرو المستورده من هولاندا أقسمت الى مجموعتين  
وغذيت المجموعة الاولى على علائق تحتوى على ٢٢ % بروتين خام والثانية على علائق  
تحتوى على ٢٤ % بروتين خام وسجلت البيانات الخاصة بالوزن الاسبوعى وكمية  
الغذاء المستهلك ومعدل الزيادة اليومية وحسب كفاءه تحويل الغذاء وكذلك النسبة  
المئوية للوفيات \*

أجريت تجربة ذبح عند عمر ٦ ، ٧ ، ٨ أسبوع وسجلت البيانات الخاصة  
بذلك وتم استخلاص النتائج الآتية من هذه الدراسة :-  
زيادة مستوى البروتين فى علائق بدارى المائدة من ٢٢ - ٢٤% أدى الى زيادة الوزن  
النهائى لجسم الطيور حتى عمر ٨ أسبوع وكان متوسط الفرق ٢٣٠ جم لكل طائر .  
معدل الاستهلاك اليومى للغذاء يقل عند زيادة مستوى البروتين فى العليقة كفاءه  
تحويل الغذاء بصفة عامة يقل عندما ينخفض مستوى البروتين فى العليقة .  
معدل الوفيات ارتفع نسبيا فى المجموعة التى غذيت على علائق تحتوى على ٢٤%  
بروتين خام \*

مستوى البروتين فى العليقة وكذلك عمر الطيور تؤثر معنويا فى الوزن الحى للطيور  
عند اجراء تجربة الذبح وكذلك النسبة المئوية للمؤيه للقنصة . بينما أثر العمر معنويا  
فى متوسطا لنسبة المؤيه للكبد \*

لم يلاحظ تأثير معنوى لكل من مستوى البروتين والعمر على النسبة المئوية  
للدّم و الريش والكبد وذلك النسبة المئوية للتصافى فى الطيور المذبوحة \*