Comparative analysis of growth performance of broiler fed with different commercial feeds of Bangladesh

Abstract

The present research work was conducted to analyze the growth performance of broiler fed with different commercial feeds of Bangladesh. For this purpose, a total of 200 Cobb-500 broiler day old chicks were purchased and divided into four treatment groups and fed with four different commercial feeds produced in feed mills of Bangladesh. Parameters like body weight, feed intake, feed conversion ratio (FCR) and survivability were observed up to 28 days to compare the performance of different dietary groups. Regarding body weight, the highest body weight was recorded in T3 treatment groups which was statistically different from remaining groups ($P<.05$). Among the four treatment groups, highest and lowest total feed intakes were found in T3 (2388.8 gm/bird) and T1 (1772.2 gm/bird) groups. Average feed intake was found higher at four weeks of age in every treatment groups compared to early one to three weeks and they were statistically significant (($P<.05$). FCRvalue was highest (1.55:1) in T2 dietary groups indicated lower feed conversion efficiency and T4 dietary group showed better feed conversion efficiency as the FCR value was lowest (1.33:1). Compare to other treatment groups, T4 group showed 100% survivability.

Key words: Broiler, Feed, body weight, feed intake, FCR

1. INTRODUCTION

Poultry sector is one of the fastest growing agricultural sub-sectors in Bangladesh [1]. An adult person requires 120 gm of meat every day and 104 pieces of egg per year according to national health strategy but present status reveals that the availability of meat and egg are 67.17% and 63.65% respectively [2]. Poultry sub-sector plays an important role in improving nutritional status of Bangladeshi people through providing adequate protein supply within short period of time [3]. According statistics, poultry alone has added 22-27% of total animal protein in Bangladesh [3]. Along with this it has created lot of employment opportunity; at least 6 million peoples are directly or indirectly involved in this sub-sector[4]. In Bangladesh, poultry rearing was first started under traditional back yard system [5]. However, commercial poultry rearing was begun after 80s and then it has been growing rapidly but progress mainly occurs in Private sector [6]. In early 90s, lots of private farms started to produce day old broiler and layer chick and now-a-days 80% of total parent stocks demands are fulfilled through eight grant parent stocks reside in Bangladesh and remaining 20% are imported[7]. There are 82 parent stocks farms and hatcheries operating in Bangladesh and producing 55-60 lac broiler chicks and 5 lac layer chicks per week[7].

Recently, demand of poultry meat and egg has been increased significantly and to meet this demand private and government sectors should have to work together [3]. Now the government is also focusing poultry sector and encouraging the people of both rural and urban. People are now becoming more involved in this sector and taking it as a business [4].

Along with government, many private sectors are working in this sector for developing poultry and poultry product like Nourish Poultry, Kazi Poultry, CP (Bangladesh) Co., Ltd, Paragon Poultry, Aftab Poultry, Aman Poultry, Provita Poultry etc. Therefore, good management practices can improve the sector lot [8].

Feed produced in different feed mills used to nourish the poultry. At present there are 120 feed mills operating and producing feed, of where 65-70 consider as large mills as they produce fish feed along with poultry feed and remaining are comparatively smaller[7]. A total of 5.94 million tons poultry feed are required but existing feed mills can supply only 46% of total feed so this sector needs improvement[9]. It is believed that optimal production of a poultry farm depends mainly on quality of feed. Low quality feed has negative impact on poultry health as it contains low nutrient contents. Sometimes levels of nutrients in feed ration are overlooked by farm owners that effects on productions [10]. Considering above fact, the present study was conducted to analyze the growth performance of broiler especial emphasize on body weight, feed intake, feed conversion ratio and survivability by feeding of different commercial feeds.

2. MATERIALS AND METHODS

2.1 Study design

The research work was carried out in an intensive poultry farm of Cox's Bazar district of Bangladesh during internship placement for the Doctor of Veterinary Medicine (DVM) program of Chittagong Veterinary and Animal Sciences University, Bangladesh. For this purpose, a total of 200 day-old Cobb-500 broiler chicks were purchased from a commercial company. All the birds were divided into 4 treatment groups namely T1, T2, T3 and T4, where each treatment group had 50 birds with five replications of 10 birds. The birds were reared for 4 weeks during the period from 15th February to 13th March, 2016. Four different commercial broiler feeds were supplied to the chickens of four treatment groups*ad libitum*. Treatment groups T1, T2, T3 and T4were supplied by AF, NF, EF and QF feeds respectively. Due to commercial issue here we used code name for each feed. Chickens of different treatment groups were supplied with starter feed followed by grower and finisher. All the standard management procedures were followed during rearing time.

Comment [ANN1]: Tabulate composition of each treatment

Comment [ANN2]: Abbreviation full name first

2.2 Data collection

The live weight of chicks was recorded at day old and every week up to 4 weeks of age. Feed intake and live weight gain of each treatment groups were recorded weekly to know the average feed intake and weight gain of the broilers. Feed Conversion Ratio (kg feed/kg wt. gain) was calculated by dividing feed intake with body weight gain [11]. Along with these survivability rates of birds were also recorded.

2.3 Statistical analysis

All the data were recorded in MS excel sheet (MS-2010) and imported to SPSS software (IBM SPSS-25.0).Data were analyzed by ANOVA test and significance differences among the different treatment groups were tested by multiple comparison testsnamely Tukey's test.

3. RESULTS AND DISCUSSION

3.1 Live weight and live weight gain

The total live weight and live weight gain per week of broilers under 4 different treatment groups are presented in Table 1 and Table 2. In case of total live weight, highest one (1650.8 gm/bird) was observed in T3 groups where EF feed was supplied and that was significantly (P<.05) differ from other three treatment groups. The lowest body weight (1249.5 gm/bird) was found in T1 groups and that also significantly differ from others.The differences of total live weight among four treatment groups may be the nutritional factor [12]. From the Table 1, it is seen that live weight of broilers in each treatment groups were gradually increased with ages. After four weeks, the total body weight of T1, T2, T3 and T4 were1249.5 gm/bird, 1500 gm/bird, 1650.8 gm/bird and 1499.5 gm/bird respectively that are varies from the research of Shahidullah et al [13] who found that the live weight of commercial broiler at 4th weeks age is 1450 gm/bird but the study found higher body weight than the report of Sarkar et al [14] who reported 1200 gm/bird at 4th weeks of age. From one to four weeks observation, the average body weight gain per week was increased with the advancement of ages and their differences were found statistically significant (Table 2). In first week, highest weight gain was observed in T2 and T3 groups but the difference between them was statistically similar. In case of second week, highest average body weight gain was recorded in T3 groups and it differed significantly with other treatment groups. Similar observation was also found at three weeks of ages. But the body weight gain was highest in T4 groups at the age of four weeks and it differed significantly with T1 but not with T2 and T3 groups (Table 2). The result was supported by Hossain et al [10] but somewhat varied from Roy et al [15].

Table 1. Total body weight of broiler in four treatment groups (gm/week/bird)

Weeks	Treatment				Level of Significance (P<.05)
	T1	T2	T3	T4	
DOC	39.9±0.96	39.9±1.44	40.1±1.21	39.9±1.50	0.846
First	220.1±2.56^{a}	240.4±3.09^{b}	241.1±3.04^{b}	239.3±5.04^{b}	0.000
Second	450.5±2.98^{a}	500.0±3.15^{b}	600.3±3.60^{c}	496.5±5.20^{b}	0.000
Third	800.0±3.70^{a}	950.1±3.35^{b}	1104.4±3.54^{c}	947.5±4.34^{b}	0.000
Fourth	1249.5±5.48^{a}	1500.4±4.14^{b}	1650.8±4.67^{c}	1499.5±4.82^{b}	0.000

Means bearing uncommon superscript in a row differ significantly

Comment [ANN3]: What is this?

Table 2. Average weekly body weight gain of broiler infour treatment groups (gm/week/bird)

Weeks	Treatment				Level of Significance (P<.05)
	T1	T2	T3	T4	
First	180.2±2.36[a]	200.5±2.62[b]	200.8±2.67[b]	199.6±5.82[b]	0.000
Second	230.4±4.78[a]	259.5±3.98[b]	359.3±4.79[c]	257.2±6.32[b]	0.000
Third	349.5±3.49[a]	450.1±6.04[b]	504.1±4.56[c]	450.9±7.42[b]	0.000
Fourth	449.5±7.39[a]	550.2±6.56[b]	546.3±5.14[b]	552.0±4.75[b]	0.000

Means bearing uncommon superscript in a row differ significantly

3.2 Feed intake

The total feed intake was highest (2388.8 gm/bird) in T3 group which was fed with EF feed and was lowest in T1 group provided with AF feed. The difference in among the four treatment groups was found statistically significantly (P<.05) in term of total feed intake (Table 3). From the table 3, it isalso seen that the feed intake of T1, T2, T3 and T4 groups were increased with the increases of ages. Compare to weeks, average feed intake was highest in fourth weeks of ages and among the fourth treatment groups, highest feed intake was recorded in T2 treatment group at four weeks of ages where NF feed was supplied (Table 4). Similar observation was also found at first week ages. But in case of both second and third weeks, average feed intake was highest in T3 treatment group where EF feed was provided. The average feed intake per weeks was increased significantly with the advancement of ages. Similar results were also observed in previous research of Bangladesh[10,16].

Table 3. Total feed intake of broiler in four treatment groups (gm/week/bird)

Weeks	Treatment				Level of Significance (P<.05)
	T1	T2	T3	T4	
First	202.5±1.03[a]	252.1±1.35[b]	227.8±0.95[c]	225.9±6.68[c]	0.000
Second	505.7±1.61[a]	707.2±1.7[b]	777.8±2.43[c]	582.5±6.23[d]	0.000
Third	1009.2±2.53[a]	1417.6±2.39[b]	1513.9±2.03[c]	1151.7±9.63[d]	0.000
Fourth	1772.2±2.42[a]	2331.7±2.53[b]	2388.8±2.69[c]	2009.4±12.37[d]	0.000

Means bearing uncommon superscript in a row differ significantly

Table 4. Average weekly feed intake of broiler in four treatment groups (gm/week/bird)

Weeks	Treatment				Level of Significance (P value)
	T1	T2	T3	T4	
First	202.5±1.03[a]	252.1±1.35[b]	227.8±0.95[c]	225.9±6.68[d]	0.000
Second	303.2±0.98[a]	455.1±1.11[b]	550.0±1.77[c]	356.6±6.14[d]	0.000
Third	503.4±1.10[a]	710.3±1.19[b]	736.1±0.98[c]	569.2±6.29[d]	0.000
Fourth	763.5±0.89[a]	914.1±0.64[b]	874.9±0.98[c]	857.6±6.72[d]	0.000

Means bearing uncommon superscript in a row differ significantly

3.3 Feed conversion ratio (FCR)

At the end of 28 days rearing, the highest feed conversion ratio (FCR) was recorded in T2 treatment groups (1.55) and the lowest FCR (1.33) was found in the T4 treatment groups (Table 5). It is said that, birds having higher FCR values commonly considered as poorer in performance than those which have lower FCR or vice versa. From table 5, it is seen that FCR was increased with the advancement of ages in every treatment group and the difference among different treatment groups were found statistically significant (P<.05). Table 6 represents the average weekly feed conversion ratio. The average weekly FCR was highest at four week ages and lowest at first week ages which indicates that with the increase of age the broiler consume higher amount of feed that conversion into meat. The difference of FCR at first and fourth week may be the intestinal development [10]. The present findings support the previous results [14~~,16~~, 16-17] reported higher FCR with the advancement of ages.

Table 5. FCR value of broiler in four treatment groups

Weeks	Treatment				Level of Significance (P<.05)
	T1	T2	T3	T4	
First	0.92±0.01[a]	1.04±0.01[b]	0.94±0.01[a]	0.94±0.04[a]	0.000
Second	1.12±0.01[a]	1.41±0.01[b]	1.29±0.01[c]	1.17±0.02[d]	0.000
Third	1.26±0.01[a]	1.49±0.01[b]	1.36±0.01[c]	1.21±0.01[d]	0.000
Fourth	1.41±0.01[a]	1.55±0.01[b]	1.44±0.01[c]	1.33±0.01[d]	0.000

Means bearing uncommon superscript in a row differ significantly

Table 6. Average weekly FCR value of broiler in four treatment groups

Weeks	Treatment				Level of Significance (P<.05)
	T1	T2	T3	T4	
First	1.12±0.01[a]	1.25±0.1[b]	1.13±0.01[a]	1.13±0.05[a]	0.000
Second	1.31±0.02[a]	1.75±0.02[b]	1.53±0.02[c]	1.38±0.04[d]	0.000
Third	1.43±0.01[a]	1.57±0.02[b]	1.46±0.01[a]	1.26±0.02[c]	0.000
Fourth	1.70±0.02[a]	1.66±0.01[b]	1.60±0.01[c]	1.55±0.01[d]	0.000

Means bearing uncommon superscript in a row differ significantly

3.4 Survivability

During the experiment total seven birds were died where highest number was from T2 group (4) followed by T2 group (2), T3 groups (1) and survivability rate was 100% in T4 groups. Jahan et al [16] was also observed highest survivability rate in crumble feed consumed groups. Feeds may have an effect on mortality rate. Similar results was also observed in previous study [10~~,14,18~~, 14, and 18].

4. CONCLUSION

Feed conversion ratio (FCR) is affected by the intake of feed, rate of growth of birds, contents of ration, efficiency of feed, nutrient adequacy of the ration, management of poultry, environmental temperature, health condition of the birds. The meat production depends on mainly FCR and it increases with the ages. Problems of FCR represent a real waste to the broiler farmer and have a significant economic impact. Correcting FCR problem requires

communication and coordination across the whole production unit, from manufacture to farmer and processor.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

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