CHAPTER-I

INTRODUCTION

Bangladesh is an agro-based developing country in the world. Poultry farming is an emerging industry and flourishing day by day in the country to meet the huge demand of meat and egg of the people. Many factors are liable for the profitable poultry production. Feed is one of the vital factors amongst the numerous inputs required for the successful poultry farming. Feed is the largest single input of expenditure in animal production, so optimum production is not at all achieved until the feed cost is minimized or kept at the minimum possible level.

The main target of rearing poultry is to provide premium quality meat and egg to the consumers at the reasonable prices. To achieve this goal, poultry should be fed correct amount of quality feed, which contains all sorts of necessary nutrients required for the optimum production of the birds. To supply this, poultry should be provided quality diet which can affect meat and egg production adversely.

It is reported that quality is the sole factor that determines quality production. In poultry, quality poultry meat and egg production is only possible, when the poultry receive quality feed.

However, amongst the different sections of poultry enterprises, feed companies play a significant role in supplying feed to the poultry including other livestock. There are a pretty good number of feed companies now in operation in the country, and these feed companies are working actively and producing ready-made broiler feeds to meet the huge feed demand of the poultry industry. Apart from ready-made feeds, self-mixed feeds are also another source of poultry diet, which are prepared by the farmers themselves to meet the feed requirement of the poultry. It is obvious that majority of the poultry integrators depends on the ready-made feeds retrieved from the feed industry compared to self-mixed feed to run their poultry farming. The reason behind this, most of the farmers are ignorant and actually do not know how to formulate balanced diet to run their poultry business. So, the demand of ready-made diets of poultry is increasing day by day and is being exclusively used by the

majority poultry farmers across the country. As the quality of feed is the main determinant factor for the successful poultry farming, it is very important to explore the quality of compound or ready-made broiler diets manufactured in Bangladesh.

Although we do not know the exact number of feed mills now in operation in Bangladesh, about forty feed mills with 900 dealers at the private sector are manufacturing and supplying poultry feeds across the country (Latif, 1999). Currently, the number of feed mills are in increasing trend, a report stated that there are about 60-65 feed mill companies available in Bangladesh (Chowdhury, 2013). Only 15 to 20 feed mills are playing a major role in producing and supplying poultry feeds across the country.

However, there is still doubt that broiler feed manufactured by the different feed mills in Bangladesh may or may not meet the all standard required for assuring the proper quality of the manufactured feed. It is well known to all that quality feed could only warrant the optimum production of a poultry farm. The productivity of broiler chicken might reduce drastically if the birds have a free access to poor quality feeds.

We do know that mixed or compound feed is composed of numerous feed ingredients. So the quality of mixed feed depends on the each and every individual ingredient used for the formulation of mixed diet. Ingredients are the single variable unit and its quality is very much important for the diet formulation of poultry, because it can influence the feed quality to a great extent. The feed quality may be deteriorated by various ways. For example, the adulteration of some ingredients by the unscrupulous or dishonest people, the supply of locally available poor quality ingredients, indiscriminate uses of the chemicals in the diets, poorly stored feedstuffs, numerous foreign particles, uses of mouldy or musty feed, toxic factors, high fibrous materials in the diets etc., could make the feed quality unsatisfactory.

However, a very few research works have been done regarding the quality of the ready-made or compound broiler feeds in Bangladesh. For this reason, data are not available regarding the nutritional status of these diets, and thus most of the farmers and researchers are not aware of the quality of the ready-made broiler feeds

manufactured in Bangladesh. Although it is sometimes noted that, some feed companies mention few nutritive values on the bag of their manufactured products, the prescribed values differ very often or go wrong, or not up to the mark, when the feeds are analysed in the lab. Moreover, farmers are also getting unsatisfactory results when they feed these diets to the broilers in many cases and the cost of the ready-made diet is also comparatively higher than the feed prepared by the farmer's own hand in their farm.

Even though some feed companies are trying to reduce the feed cost and to maintain the quality of their products, but most of the others are being failure to do so due to lack of skilled man power, proper facilities, reliable information, knowledge, regulatory bodies, increased raw material cost and machineries. As a result, poultry raisers or integrators are being failure to get optimum production, and also facing a great economic loss by using these diets to poultry. The information and ideas retrieved from this study might be beneficial to the farmers, or could have a potential to improve the broiler productivity and to decrease production cost of the poultry feed. Considering this view in mind, the present study was undertaken to meet the following objectives.

Objectives:

1. To determine the nutritional status of commercially available broiler ready-made feeds produced in Bangladesh.
2. To investigate the gross responses (feed intake, weight gain, feed conversion ratio) of broiler chickens fed on the obtained diets.

CHAPTER-II

MATERIALS AND METHODS

2.1 Location of the experiment

The experiment was conducted in Chittagong Veterinary and Animal Sciences University (CVASU), Khulshi, Chittagong, to evaluate the ready-made broiler feeds based on visual observations, chemical analyses and feeding trials with broilers from d1-25 days. Biological trial was conducted during the period of March to April, 2017 at the Poultry Research Shed and the laboratory analyses were rendered in the Poultry Research & training Institute (PRTC) of CVASU, Khulshi, Chittagong.

2.2 Preparation of the experimental house

The experimental shed was prepared by cleaning and washing properly using tap water with caustic soda. Ceiling, walls and floor were disinfected using Aldekol solution (1ml/2ltr water). After that, the house was left for one week clean battery cage was placed in the room to run the experiment. After drying the room, fumigation was done (adding 35ml of formalin to 10gm potassium permanganate per cubic meter) and sealed for 24 hours.

2.3 Layout of the experiment

A total of 96 (Ross 308) day-old broiler chicks of either sex were collected from the local hatchery (Nahar Agro Complex Ltd, Chattogram) on a pre-order basis to the run the experimental trial from d1 to 25 days. The chicks were weighed (46.33±0.01g/b) on receipt and then randomly assigned into four dietary treatments groups (D_1, D_2, D_3 and D_4) each treatment was replicated 4 times with 6 birds per replicate in a completely randomized design. The layout of the experiment was shown below in Table 1.

Table 1: Layout of experiment

Treatment	Number of birds per replication				No. of birds
	R_1	R_2	R_3	R_4	
D_1	6	6	6	6	24
D_2	6	6	6	6	24
D_3	6	6	6	6	24
D_4	6	6	6	6	24
Total	24	24	24	24	**Grand total= 96**

2.4 Selection of ready-made broiler feeds

Four ready-made broiler feeds were selected randomly, on the basis of feed availability in the nearby local market; brand, price and acceptability of the farmers.

2.5 Collection of feed samples

The feeds were collected from market by purchasing method, and fed the birds' entire the trial period.

2.6 Evaluation of the quality of ready-made feeds by visual observation

Prior to supply to birds the physical and or sensorial characteristics of feeds were observed carefully during collection and just before supplying the feeds to the birds. The following criteria were observed.

Moisture was less than 12%, Brownish in colour, fine particle size, cylindrical in texture, crumble in nature, good flavour, no offensive odour or smell, no bitter or dull taste, free from foreign particles (sand, soil, dust, weeds, iron, nail, stone etc.) and free from foreign body (moulds, fungus, insects, pests etc).

Comment: Apparently seemed to be qualitative in nature or not.

Inference: The feeds possessed the criteria of a quality feed or not.

2.7 Sampling of feeds for chemical analysis

To ascertain the variation of nutrient status of the given ready-made feeds, 8 samples were collected from the purchased feeds. The samples were than analysed in the laboratory for the determination of nutrient concentration.

2.8 Determination of nutrient content of feed sample

The procedure for the estimation of dry matter (DM), crude protein (CP), crude fibre (CF), ether extract (EE), Ash, nitrogen free extract (NFE) etc., were those of AOAC (1990). True metabolizable energy (TME) content of the taken samples was determined indirectly by using the values of CF, EE, and Ash contents (%) fitted to a formula suggested by Wiseman (1987). Metabolizable energy (ME) was determined indirectly on the basis of true metabolizable energy (TME) contents of the feed samples, assuming that TME was 8% higher than the ME, as it is reported that TME is 5-10% higher than ME (Wiseman, 1987). Dry matter (DM) was determined by oven dry method. Crude protein (CP) was determined by kjeldahl method. Crude fibre (CF) was analysed by digestion method. Ether extract (EE) was quantitated with the help of Soxhlet apparatus. Ash was measured by igniting the pre-ashing sample on a muffle furnace at a temperature of 600°C for four hours. Nitrogen free extract (NFE) was estimated by subtraction method. It was determined by subtracting all organic matters from one hundred. Calcium and phosphorus were determined by atomic absorption and spectrophotometry, respectively.

2.9 Uses of experimental feeds

Broiler starter diets of four different ready-made feeds were provided to the experimental birds throughout the experimental period.

2.10 Management

The following management procedures were followed during the experimental period and the uniformity in the management practices was maintained.

2.10.1 Housing and brooding

The collected 96 chicks were randomly distributed in the 16 cages of equal size (3.5 ft. × 1.63 ft.) which were cleaned and disinfected previously. A 100 watt electric bulb was hanged at a height of 45 cm. in the middle of each cage to maintain appropriate brooding temperature.

2.10.2 Floor space

Each pen having size 3.5 ft. × 1.63 ft. was allotted for 6 birds. Therefore, floor space for each bird was 0.95 sq. ft.

2.10.3 Feeder and drinker space

One feeder having size of 120 cm ×10 cm ×12 cm, and one round drinker with a capacity of 2.5 litres were provided in each cage. The feeder and drinker were fixed in such a way so that the birds are able to eat and drink conveniently. Drinkers were washed and dried up daily in the morning, and feeders were cleaned weekly.

2.10.4 Feeding and watering

During the experimental period, *ad libitum* feed and water were supplied to birds. Feeds were supplied to the birds twice a day at 6 AM and 6 PM respectively. Fresh drinking water was supplied three times a day i.e. at 6 AM, 2 PM and 6 AM.

2.10.5 Lighting

The birds were exposed to a continuous lighting of 23 hours and a dark period of 1 hour in each 24 hours of photoperiod.

2.10.6 Immunization

All the birds were vaccinated against Newcastle Disease (ND), Infectious Bursal Disease (IBD) as per schedule given in Table 3. The BCRDV and RDV vaccine were freeze dried vaccine which were diluted with 6 ml distilled water to make them 100 doses vaccine.

The CH80 vaccine was also diluted with the 30 ml diluent that was provided with the vaccine. Though it was 500 doses vaccine, only 100 doses was used in the experiment. All the vaccines were given through ocular route.

Table 2: Vaccination schedule of the experiment

Age of experimental birds (days)	Name and type of vaccine	Name of disease	Route	Source
7th day	BCRDV (Live vaccine)	Newcastle Disease	Eye drop	DLS
12th day	CH80 (Live vaccine)	Infectious Bursal Disease	Eye drop	Hipra
17th day	RDV (Live vaccine)	Newcastle Disease	Eye drop	DLS

2.10.7 Medication:

During the first day of the experiment, the day- old chicks are supplied with glucose (Glaxose-D) @ 1gm/2 litre drinking water. To reduce the heat stress, juice of lemon was used with water as source of vitamin C @ 1 lemon/5 litre water.

2.11 Record keeping:

The following parameters were recorded throughout the experimental period.

2.11.1 Body weight:

The live weight of day old chicks was recorded at the first day of the experiment, and at the beginning of each week the birds of each replication of each treatment was weighted, and recorded properly.

2.11.2 Feed intake:

Weekly feed intake was recorded by deducting the left over feeds from the total amount supplied to birds each week.

2.11.3 Temperature and relative humidity of house:

During the experiment the temperature and relative humidity were recorded four times a day i.e. 6 AM., 12 PM., 6 PM. and 12 AM. The temperature and relative humidity was recorded with the help of hygrometer.

2.12 Calculation of data:

2.12.1 Weight gain: The weight gain was calculated by deducting the initial body weight from the final weight.

2.12.2 Feed conversion ratio (FCR): The amount of feed consumed per unit of weight gain is called feed conversion ratio. This was calculated by using the following formula:

$$\text{FCR} = \frac{\text{Feed intake (gm)}}{\text{Body weight gain (gm)}}$$

2.13 Statistical analysis:

All recorded and calculated data were statistically analyzed for analysis of variance in a Completely Randomized Design (CRD) using the Minitab statistical computer package program (Minitab, 2000). The significance of differences between means was tested using the Duncan multiple-range test. Statistical significance was considered at $P \leq 0.05$.

Pictorial presentation of some activities during experiment

Fig. 1: Birds within the experimental cage

Fig. 2: Giving water to the birds

Fig. 3: Feeding the birds

Fig. 4: Vaccination of birds

Fig. 5: Weighting of birds

Fig. 6: Weighting of feed

CHAPTER-III

RESULTS

3.1 Chemical analysis of feeds

The results of chemical analysis of feeds manufactured in different companies are presented here under the following sections.

3.2 Variation of nutrient contents in different ready-made feeds of broiler starter

The chemical compositions of four different ready-made broiler feeds are shown in Table 3. The information regarding the levels of nutrients in the feeds as claimed by different feed companies and desired level required for the broilers chicks, are also included in the Table 4, for comparison. For convenience of better presentation, the quality of a feed with respect to its nutrient contents, the analytical values of nutrients of different ready-made feeds are also discussed here.

The analytical values of nutrients of the feed samples are shown in Table 4. In case of broiler starter ration, the analytical values of most of the nutrient contents of the feed samples differed significantly, except for the Phosphorus content and Calcium and Phosphorus ratio of the four feed samples.

From the Table 3, it is found that the DM content is higher in the group D_2 and is lower in the group D_1. The variation of amount in the four feed samples is statistically significant. In case of CP contents, significant variation ($P<0.05$) is also found among these dietary groups. The CP level is higher in D_4 and lower in D_2. CF content is higher in D_1 and lower in D_3, and the variation is also significant ($P<0.05$) among the diet groups. Ether extract content is significantly higher in the D_4 and lower in D_2. Significant ($P<0.05$) variation is also prevailed among the groups in case of EE. Ash content is significantly higher in D_4 and lower in D_3 in comparison with other dietary groups.

Table 3: Chemical analyses of different ready-made broiler feeds (starter)

Nutrients (%)	Dietary treatments				Pooled SEM	P-values
	D_1	**D_2**	**D_3**	**D_4**		
DM	87.74^{c}	90.05^{a}	89.79^{b}	89.63^{b}	0.0148	0.01
CP	23.05^{b}	21.20^{d}	21.85^{c}	24.49^{a}	0.040	0.01
CF	5.73^{a}	4.77^{b}	3.98^{c}	4.33^{b}	0.009	0.01
EE	7.4^{b}	6.98^{d}	7.16^{c}	8.00^{a}	0.0128	0.01
Ash	5.65^{b}	5.23^{c}	4.80^{d}	6.11^{a}	0.007	0.01
Ca	1.11^{a}	1.00^{b}	0.99^{c}	1.05^{c}	0.0021	0.01
P	0.66^{a}	0.58^{b}	0.52^{b}	0.57^{b}	0.008	0.05
ME (Kcal/kg)	3253.25^{d}	3356.68^{c}	3413.24^{a}	3378.14^{b}	0.590	0.01
ME(Mj/kg)	13.66^{d}	14.10^{c}	14.34^{a}	14.19^{b}	0.002	0.01
C:P ratio (calorie: protein ratio)	141.14^{b}	158.33^{a}	156.22^{a}	137.94^{b}	0.292	0.01
Ca : P ratio (calcium: phosphorus ratio)	1.69	1.74	1.91	1.85	0.022	0.073

[DM: Dry matter; CP: Crude protein; CF: Crude fibre; EE: Ether extract, Ca: Calcium, P: Phosphorus; ME: Metabolizable energy]

This is also noticed that significant variation is also observed in case of the Ca content. Calcium content is found higher in D_1 and lower in D_3. But there is no significant variation in case of P contents. Though P level is higher in D_1, it is statistically similar with D_2. Lower P content is found in group D_3 but it is statistically similar with group D_4. It is noted from the Table 3 that the ME content is significantly higher in the D_3 and D_4 in comparison with other D_1 and D_2 groups ($P<0.05$). Among these groups, the ME content is higher in the D_3 group, which is 3413.24 Kcal/kg and is lower in the group D_1, which is 3253.25 Kcal/kg. In case of calorie protein ratio, D_1 and D_4 groups contain 141.14 and 137.94, respectively though statistically similar, and D_2 and D_3 groups are also statistically similar. There is no significant variation ($P>0.05$) found for the Ca and P ratio among the dietary group. According to the study, the Ca and P ratio is found higher for group D_3 and lower in group D_2, respectively.

Table 4: Comparative study of nutrient concentrations of different ready-made broiler starter feeds and requirement of broiler chicks

Trt.	Report/ Data	Nutrient concentration						
		ME (kcal/kg)	**CP%**	**CF%**	**EE%**	**Ash %**	**Ca%**	**P%**
D_1	Feed company report	2950	21.5	5	3.5	6	1	0.5
	Analytical report	3253.25	23.05	5.73	7.4	5.65	1.11	0.66
	Requirement of strain	3025	22-25	-	4-6	-	1.05	0.5
D_2	Feed company report	2950	21	5	5	6	1	0.45
	Analytical report	3356.68	21.20	4.77	6.98	5.23	1.0	0.58
	Requirement of strain	3025	22-25	-	4-6	-	1.05	0.5
D_3	Feed company report	3000	22	4.5	4.5	6	1.05	0.5
	Analytical report	3413.24	21.85	3.98	7.16	4.8	0.99	0.52
	Requirement of strain	3025	22-25	-	4-6	-	1.05	0.5
D_4	Feed company report	2900	22	5	4	7	1	0.5
	Analytical report	3378.14	24.49	4.33	8.00	6.11	1.05	0.57
	Requirement of strain	3025	22-25	-	4-6	-	1.05	0.5

3.3 Comparative study of the nutrient concentrations in different ready-made feeds of broiler starter

The analytical values of nutrient contents of broiler starter ration of four different ready-made feeds along with the required levels of strain and feed companies are presented in Table 4. In case of D_1, the nutrient concentration obtained by chemical analysis revealed that the CP, Ca and P contents are more close to the required levels to that of feed company except for the ME, CF and EE contents that are higher than the required amount. From this comparative table 4, it is also observed that the ME, CF and EE contents of D_2 are higher in the analytical report than requirement and CP content is lower than the required amount. The other value of Ca and P contents are closely similar with the analytical and required amount. The CP, CF, Ca and P contents of D_3 are nearly similar with the analytical report and the company report.

But the ME and EE contents are much higher in analytical report than both the company report and requirement. Similarly, all sorts of nutrient concentrations of D_4 are more or less higher in the analytical report than required amount.

3.4 Gross responses of broiler chickens fed diet of different ready-made feeds

The results obtained through biological trial of feeds are presented under the following section heads.

3.4.1 Body weight gain

The results of cumulative and weekly feed intake (FI), live weight (LW), live weight gain (LWG) and feed conversion ratio (FCR) of broiler chickens fed diets of different feed mills are shown in Tables (5 & 6) respectively. It is evident that LWG of birds fed different ready-made feeds during experimental period (day 1 to 25 days of age) showed no significant difference ($P>0.05$) in weekly live weight gain. The LW of broilers also tended to be significant ($P<0.097$) between treatment from d1-25 days.

3.4.2 Feed intake

The feed consumption of birds during different stages of growth in different dietary treatments is given in Table 5. Results showed that feed intake had no significant difference ($P>0.05$) between treatment from d1-25 days. The feed intake (FI) of broilers from d1-7 tended to be significant ($P<0.057$) between treatments, though it showed no difference ($P>0.05$) between two feed mills. Birds on D_1 group consumed more feed than the broilers of other diet group on day 1-7.

3.4.3 Feed conversion ratio (FCR)

The efficiency of feed of broiler chicks in different dietary treatments recorded during different stages of growth is presented Tables (5 & 6). Data revealed that the FCR of broilers differed significantly ($P<0.05$) between treatments from d1-7 days only, even though no difference ($P>0.05$) was observed in FCR of birds from d1-25 days (Tables 5 & 6). It indicates that birds of D_2, D_3 and D_4 diet groups assumed to be more efficient in converting feed to meat than the broilers of D_1 group during the

experimental period of d1-7days. The FCR of broilers tended to be significant (P=0.06) between treatment from d1-25 (Table 6). It shows that the birds of D_2 diet group assume to be more efficient than that of others, as the broilers of this diet group (D_2) had received a better FCR (1.27) than that of other diet groups.

Table 5: Weekly feed intake (FI), live weight gain (LWG) and feed conversion ratio (FCR) of broiler chickens fed diets of different ready-made feeds from d1-25 days (N=96)

Parameters	Age (days)	Dietary treatments				Pooled SEM	P-values
		D_1	D_2	D_3	D_4		
FI(g/b)	1-7	179.00	158.00	164.00	167.40	2.475	0.057
	8-14	472.54	450.50	466.36	480.88	6.248	0.404
	15-21	749.46	722.08	736.05	699.71	14.005	0.642
	22-25	376.79	369.38	392.66	399.50	10.062	0.704
LWG (g/b)	1-7	178.29	169.04	173.17	179.54	2.240	0.362
	8-14	364.08	357.75	360.90	347.54	3.893	0.494
	15-21	570.82	554.08	560.19	508.42	8.560	0.101
	22-25	256.21	252.00	242.87	244.71	4.128	0.644
FCR	1-7	1.00^a	0.93^b	0.94^b	0.93^b	0.083	0.029
	8-14	1.30	1.26	1.29	1.38	0.016	0.100
	15-21	1.31	1.30	1.31	1.38	0.016	0.413
	22-25	1.48	1.47	1.62	1.64	0.047	0.450

[Data refer to mean values of 6 birds consisting of 4 replicates per treatments from d1-25 days]

Table 6: Cumulative feed intake (FI), live weight (LW) and feed conversion ratio (FCR) of broiler chickens fed diets of different ready-made feeds from d1-25 days (N=96)

Parameters	Age (days)	Dietary treatments				Pooled SEM	P-values
		D_1	D_2	D_3	D_4		
FI(g/b)	1-7	179.00	158.00	164.00	167.40	2.475	0.057
	1-14	651.54	608.13	630.0	648.25	7.843	0.236
	1-21	1401.00	1330.10	1366.00	1348.00	18.925	0.605
	1-25	1777.80	1700.00	1758.60	1747.50	19.500	0.554
LW(g/b)	1-7	223.04	212.83	217.21	223.54	2.458	0.395
	1-14	587.13	570.58	578.11	571.08	5.968	0.742
	1-21	1158.00	1124.70	1138.30	1079.50	12.725	0.216
	1-25	1414.30	1376.70	1381.20	1324.20	11.450	0.097
FCR	1-7	1.00^a	0.93^b	0.94^b	0.93^b	0.083	0.029
	1-14	1.20	1.15	1.18	1.23	0.011	0.188
	1-21	1.26	1.23	1.25	1.30	0.009	0.13
	1-25	1.30	1.27	1.32	1.37	0.010	0.06

[Data refer to mean values of 6 birds consisting of 4 replicates per treatments from d1-25 days]

Here the highest feed conversion ratio is observed in broilers of group D_4 which is 1.37 followed by broilers of group D_3, D_1 and D_2 which are 1.32, 1.30 and 1.27 respectively. It is noteworthy that dietary group having higher feed conversion ratio value usually regarded as poorer in performance than which have lower feed conversion ratio.

CHAPTER-IV

DISCUSSION

4.1 Variation of nutrient composition of ready-made feeds

The analytical values of nutrients of the feed samples reported that, the most of the nutrient contents of the feed samples differed significantly, except for the P content and Ca: P ratio of the four different ready-made feeds. Many factors such as the variability of nutrient composition, feed selection, choice of feed used for feed formulation, stage of production, purpose, ingredient quality, adequacy of nutrients in the particular feed ingredient, harvesting time, digestibility factors, crude fibres contents, type of birds to be used, anti-nutritional factors etc. might influence the nutritive values of each ready-made feed. Similar variation in the nutrient composition of ready-made feeds of broilers was also observed by previous researchers (Hossain *et al.*, 2008; Roy *et al.*, 2004).

However, the data revealed that significantly higher CP content (24.50%) was observed in D_4 diet and D_2 being the lowest CP (21.20%). The nutrient profile of CP content indicate that the amount of CP found in the ready-made feeds, is sufficient for their normal growth as stated by the individual breeder company or NRC requirements (1994) during starter period. The differences of C: P ratio (calorie protein ratio) between treatments appears to be in normal range, and it could stimulate similar growth responses of different ready-made broilers fed diets measured here in this study.

It is said that, birds eat feeds mainly to satisfy their macro-nutrient (energy) requirements and once this is met, they will not consume any more feeds, even if the requirements of other nutrients like protein, vitamins or minerals have not been met (Singh and Panda, 1996). The most of the CF contents of the feed components was found below 5% and it is in normal range and is favourable for broiler chickens. The increased fibre in broiler diet might decrease the digestibility of nutrient and growth performance of broilers (Hossain *et al.*, 2011).

4.2 Gross responses of broilers fed ready-made diets

Gross responses such as feed intake, body weight, weight gain and feed efficiency of broilers etc. are the key performance indicators for evaluating the broiler's growth responses. Feed or nutrition is the main criteria or determinant factor for affecting the bird's performance. It is apt to mention here that the quality is the sole determinant factor for appraisal of feed evaluation. However, different ready-made feeds might vary in their quality, composition, physical or external characters, palatability, flavour, odour, texture, colour, presence of foreign particles (dust, stone, mouldy, nutritive value and so on). These characters of poultry feed might affect the preference or performance of broilers adversely (Cruze *et al.*, 2009; Rose and Kyriazakis, 1991; Forbes and Shariatmadari, 1994).

However, it is obvious from the gross responses data of broilers to the ready-made feeds are identical or similar, no significant differences were found between treatments. It implies that all feed had similar effect on the growth performance of broilers. Birds grew uniformly regardless of the feed sources supplied the birds, even though the nutritive values of different feeds differed significantly between treatment, as is observed in this study. The FI, BWG and FCR did not differ in spite of when the test diets were introduced to the broilers on day 25. For FI, it appears that the birds have specific breed standards or characters to meet and will achieve these targets in FI, if the nutrient composition is ideal (Hossain *et al.*, 2013).

Data demonstrated that the FCR of broilers influenced significantly during early stage of growth (d1-7 days) only, even though no effect was observed in FCR of birds at later stage (25d). The FCR of broilers tended to be significant (P=0.06) between treatment from d1-25. It indicates that the birds of D_2 dietary group assume to be more efficient than that of others, as the broilers of this diet group (D_2) had received a better FCR than that of other diet group.

This result implies that, birds fed the D_2 diet grew faster than that of other diet group from d1-25d. At the end of the experimental period, the lowest body weight gain was obtained in birds of group D_4 feed. Few works have been done regarding this, so data are scarce about the ready-made feeds available in the market.

CHAPTER-V

CONCLUSION AND SUMMARY

The experiment was conducted with 96 Ross 308 broiler chicks which were reared in the Poultry farm of Chittagong Veterinary and Animal Sciences University from day old to 25 days of age to evaluate the efficacy of ready-made broiler feeds. The study was comprised of visual observation, laboratory analysis and biological trial with those broilers.

Feeds were collected randomly from local market and those were commonly used in broiler farming. All the forms of feeds used in this experiment were similar (crumble) and only the starter feeds were used in this study to run the biological trial. Similar environment and managemental procedures were followed to rear the broilers during experiment. The chemical analysis was performed at the PRTC laboratory in Chittagong Veterinary and Animal Sciences University, Chittagong. After completing the chemical analysis of feeds, statistical analytical method was followed to find out the significant variations among the nutritional components of the four different ready-made feeds. In case of nutritional contents of four ready-made feeds, significant variation was observed in the ME, CP, CF, EE, Ash and Ca contents and insignificant variation was observed in only P content and Ca: P ratio.

From an overview of the results obtained in this study revealed that, broilers grew uniformly on all diets regardless of the sources of feed used in this study. Birds attained similar live weight, feed intake and FCR, despite the variation of chemical composition found in each diet. Variation in nutritive values of each ready-made feeds does not affect the growth, because it appears to be suffice and sufficient nutrients available in the diet that could satisfy their nutrient requirement properly. However, the performance of broilers fed on D_2 diet tended to be a bit better than other dieter groups.

The following conclusions were drawn from the results of this experiment:

1. Though there were no significant differences observed in case of performance of broilers on ready-made feeds, the feed from dietary group D_2 was appeared to be more balanced and efficient than other dietary groups.
2. Farmers who rear broiler can chose any ready-made feed from their nearby market for their broiler farming as there are no significant effects of any specific ready-made broiler feed on growth performance and feed conversion of broilers.

CHAPTER-VI

References

Chowduary, S. D. 2013. Opportunities and challenges facing commercial poultry production in Bangladesh. Eight international poultry show and seminar, World's Poultry Science Association Bangladesh Branch, Dhaka, Bangladesh.

Cruz-Suárez, L. E., Tapia-Salazar, M., Villarreal-Cavazos, D., Beltran-Rocha, J., Nieto-López, M. G., Lemme, A. and Ricque-Marie, D. 2009. Apparent dry matter, energy, protein and amino acid digestibility of four soybean ingredients in white shrimp Litopenaeusvannamei juveniles. Aquaculture. 292(1-2): 87-94.

Forbes, J. M. and Shariatmadari, F. 1994. Diet selection for protein by poultry. World's Poultry Science Journal. 50(1): 7-24.

Hossain, M. A., Suvo, K. B. and Islam, M. M. 2011. Performance and economic suitability of three fast-growing broiler strains raised under farming condition in Bangladesh. International Journal of Agricultural Research, Innovation and Technology. 1: 37-43.

Hossain, M. A., Islam, A. F. and Iji, P. A. 2013. Growth responses, excreta quality, nutrient digestibility, bone development and meat yield traits of broiler chickens fed vegetable or animal protein diets. South African Journal of Animal Science. 43(2): 208-218.

Hossain, M. A., Chowdhury, S. D., Roy, B. C., Miazi, O. F. and Islam, M. M. 2008. Chemical evaluation the broiler feeds (pellet) received from different feed mills in Bangladesh. International Journal of Sustainable Agricultural Technology. 4(1): 05-11.

Hossain, M. A., Islam, M. M., Islam, A. F. and Iji, P. A. 2011. Constraints to use of all-vegetable feed ingredients and strategies to improve such diets for poultry birds: a review. Bangladesh Research Publication Journal. 6(1): 120-135.

Latif, M. A. 1999. History of Poultry Industry in Bangladesh. Proceeding of the Seminar of International Poultry Show. World's Poultry Science Association, Bangladesh Branch. 11-17.

National Research Council. 1994. Nutritional Requirements of Poultry.

Roy, B. C., Ranvig, H., Chowdhury, S. D., Rashid, M. M. and Chwalibog, A. 2004. Evaluation of compound broiler feeds manufactured in Bangladesh. Livestock Research for Rural Development. 16(11): 1-8.

Rose, S. P. and Kyriazakis, I. 1991. Diet selection of pigs and poultry. Proceedings of the Nutrition Society. 50(1): 87-98.

Singh, K. S. and Panda, B. 1996. Poultry Nutrition (3rd edition), New Delhi: Kalyani Publishers. 259-269.

Wiseman, J. (Ed.). 1987. Feeding of Non-ruminantLivestock.Elsevier.

CHAPTER-VII

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The Author

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CHAPTER-VIII

BIOGRAPHY

Bhubon Chandra Halder, an intern student at Chittagong Veterinary and Animal Sciences University (CVASU), originate from Joypurhat, Rajshahi. After completing one year intern period, he will receive his Doctor of Veterinary Medicine (DVM) degree with lots of real life experiences. As an intern student he has received clinical training from Madras Veterinary College and Veterinary College & Research Institute, Namakkal, Tamilnadu, India. He has a great enthusiasm in research and has done some clinical research works. He has published one scientific paper in **Journal of Veterinary Science & Technology** titled by "Comparative Study on Newcastle Disease and Infectious Bursal Disease in Chicken Submitted to Upazilla Veterinary Hospital, Bogra Sadar, Bangladesh" and another in **Journal of Dairy, Veterinary & Animal Research** titled by "Prevalence of Dermatophytosis in Rabbits at SAQTVH, Chittagong, Bangladesh." He has an interest on Poultry science and nutrition.