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ORIGINAL ARTICLE

# Evaluation of unconventional poultry feed in broilers

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**Abstract**

**Background:** Commercial broiler is a rapidly growing sector in Bangladesh. The broilers are supplied with the balanced ration prepared from a number of ingredients which are not available uniformly throughout the years. On the other hands, manufactured feeds are costly and inconvenient for the rural farmers. This study is undertaken to use unconventional feed ingredients aiming to decrease the broiler production cost.

**Method:** A total of ninety-nine day- old broiler chicks (Hubbard) of either sex were used in this study in 3 treatment groups to assess processed unconventional feed item (shoti, blood meal, poultry dropping and molasses) on growth and profitability upon rearing for 60 days. Broilers were reared in dip litter system and were fed *ad libitum* on conventional and unconventional diet dividing into 3 treatment diets namely, treatment diet 1 (T1: Conventional as control), treatment diet 2 (T2: unconventional with blood meal and shoti), and treatment diet 3 (T3: unconventional with blood meal, shoti, poultry droppings and molasses) throughout the trial period. Treatment group 1 (T1) was used as control.

**Results:** Broilers fed on control diet (conventional feed) achieved higher ($P<0.01$) body weight, while the broilers offered diets with the highest amount of unconventional feed had the lowest body weight. Increased ($P<0.01$) feed intake was observed during 21days and 49 days of age when broilers fed diets with the supplementation, but no significant differences were found among the groups in terms of feed consumption during 33 day of age. FCR differed significantly ($P<.01$) throughout the trial period with the broilers fed diets without supplementation of unconventional feed item had the superior FCR than the others. Mortality rate was 6.06%,9.09%, and 9.09% in treatment group I, treatment group II, and treatment group III respectively while live weights, feed conversion and feed consumption was unaffected by all the dietary groups with/without incorporation of unconventional feed item up to day 60 days of age. Statistically significant ($P<0.01$) decreased live weight was observed among the treatment groups in 60-day-old birds. Productivity and cost-benefit analysis were performed.

**Conclusion:** Use of unconventional feed ingredients in broiler production greatly reduces the feed cost with little hampering the growth rate and hence, it is profitable for the farmers.

**Key words:** Broiler, Unconventional ration, Growth performance.

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**Introduction**

Poultry industry is one of the most profitable ventures of agriculture in the today's world, owing to its potentialities of providing nutritious meat within shortest possible. Its meat is very nutritious, tasty, mild flavor, tender, easy to chew or grind, blended well with other foods, and easy to digest. According to the annual report of WHO, in Bangladesh, 55 g of animal protein is required for each person in a day, whereas only 15.6 g can consume (Huque, 2008). To reduce the gap between demand and supply of animal protein, poultry can play an important role. As a result, poultry industry has been expanding vastly in the last few decades to meet the challenge. Maize and wheat have traditionally been the ingredients of choice for the supply of carbohydrate, i.e. energy source for monogastric animal diets. The constant competition for wheat and maize among livestock, chickens, and human beings may increases the cost of grains. The high cost of feed hardly permits remunerative and profitable poultry farming. The use of cereal products as livestock feed is increasingly unjustified in economic terms. Therefore, there is a need to exploit cheaper energy sources, to replace expensive cereals for poultry rearing. The use of cheaper unconventional locally available dietary ingredients reduces the production cost (Hossain 1989, Rahman and Reza 1983). Latif *et al* (l976) used shoti meal to day-old chicks at the rate of 100gm and 200gm /kg diet. He found all the chicks survived, but body weight, feed intake and feed conversion were decreasing with the increased inclusion rate of the shoti meal.

Blood meal contains about 80% protein and is an excellent sources of the essential amino acids. Blood meal can be used in poultry ration up to 10% (Banerjee 1988). Poultry manure contains about 3-5% nitrogen, 1.5-3.5% phosphorous, 1.5-3.0% potassium and micro-nutrients at considerable amount (Amanullah et al., 2010). Poultry droppings also contain enough energy and protein. Feed cost is comprised 65-75% of total production cost. But, the shoti is inexpensive, and easily available. Under intensive poultry rearing, it may reduce the feed cost of poultry in Bangladesh. With a view to reduce broiler production cost by the inclusion of unconventional feed ingredients in the ration, this experimental activity has been undertaken.

**Materials and Methods**

This experiment was carried out at Bogadia Poultry Farm, Kishoreganj Sadar, Kishoregonj Bangladesh, during the period from November to December 2014.

A total of ninety- nine day- old commercial broilers (HABBARD) having similar weights were collected from "Aftab Poultry Farm", Bajitpur, Kishoregonj. Broilers were randomly distributed into three treatment groups, each having 33 chicks, such as, treatment group I, treatment group II, and treatment group III. About 900 cm2 of floor space was provided for each broiler. Continuous photo period of 23:30 hours was provided including the natural light and electrical bulb; and a dark period of 00:30 hour every day. Broilers were supplied with three types of treatment diets namely, treatment diet 1(T1), treatment diet2 (T2), and treatment diet 3 (T3) with three replications. The experimental diets were iso-caloric and iso-nitrogenous in nature, and were supplied the broilers *adlibitum* for 60 days of trial period. Although the broilers are marketed within approximately 42 days, more time was given in this experiments to observe the effect of unconventional feed ingredients. Treatment group I, treatment group II, and treatment group III were supplied with treatment diet 1(T1), treatment diet2 (T2), and treatment diet 3 (T3) respectively.

**Collection of unconventional feed stuffs**

Selected feed stuffs such as shoti, animal blood, poultry dropping were collected and processed and combined with conventional items to formulate experimental rations for broilers. Price of different conventional and unconventional items was recorded (Table 4).

**Formulation of balance diet**

Three different types of trial ration such as (T1, T2 and T3) were prepared by all mesh system (Table 1). Trial diet 1(T1) was prepared without

supplementation of unconventional feed item to use as control whereas, treatment diet 2 (T2) and treatment diet 3 (T3) were prepared with the supplementation of unconventional feed items to assess the result. In the treatment diet 1 (T1), conventional feed ingredients such as wheat, rice polish, til oil cake, and fishmeal were used as major items. It was used as control diet. In the treatment diet 2 (T2), some unconventional feed ingredients such as blood meal and shoti were added to a lower extent with other conventional items to observe the effect of these unconventional items. In the treatment diet 3 (T3), conventional items were reduced and unconventional ingredients were added sufficiently to evaluate their efficacy on broiler production.

Table 1. Formulation of feed for different trial diets

| Name of ingredients | Amount in different treatment diets (%) | | |
|---|---|---|---|
| | T1 | T2 | T3 |
| Wheat | 49 | 48.5 | 20 |
| Rice polish | 16 | 20 | 20 |
| Til oil cake | 14 | 12 | 10 |
| Fish meal | 14 | 10 | ----- |
| Blood meal | ----- | 4 | 10 |
| Shoti | ----- | 2 | 15 |
| Poultry droppings | ---- | ------ | 15 |
| Molasses | ------- | ------ | 7 |
| Cod liver oil | 3 | ----- | ------ |
| Common salt | .5 | .5 | .5 |
| Vitamin | 1 | 1 | .5 |
| Additives | 1.5 | 2 | .5 |
| DCP | 1 | | 1 |
| Total | 100 | 100 | 100 |

**Rearing method of broiler**

All broilers had been reared in deep litter system and a standard method applied to brooding management in addition to immunization against Newcastle disease, Gumboro disease, fowl pox and coccidiosis.

**Feeding practice and observation of trial ration**

All three trial rations were supplied in tube feeder and fresh drinking water was also supplied *ad libitum.*

**Comparative study in the body growth and body resistance**

The body growth, body resistance, and mortality of different treatment groups were closely observed for a period of 2 months. The initial and final live weights of birds of different treatment groups were recorded. Body resistance i.e., ability to protect themselves from invading organisms was shown by the differential leukocyte count. In resistant birds, the number of immune system cells such as lymphocyte, monocyte, neutrophil etc. increases.

**Results**

Average performance of broiler fed on different treatment diets consisting of a variety of conventional and unconventional ingredients was found to be affected significantly (Table 2). In the treatment group 1 (T1), 2.3 kg body weight/bird was gained within 8 weeks. Total feed consumption and average daily live weight gain were recorded as 198kg and 38.34gm respectively where feed efficiency was 2.60:1. In group 2 (T2), 2.2 kg body weight/bird was gained within 8 weeks where unconventional and conventional ingredients were used to formulate ration. Total feed consumption and average daily live weight gain was recorded as 200kg and 36.84 gm respectively. Feed efficiency was 2.74:1. In

group 3 (T3), 2.2 kg body weight/bird was gained within 8 weeks. Total feed consumption and average live weight gain were recorded as 210 kg and 37.50gm respectively. Feed efficiency was 2.82:1. Average feed cost for different dietary treatment groups was recorded (Table 3).

Table 2. Average performance of broiler fed on different treatment diets

| Parameter | T1 | T2 | T3 |
|---|---|---|---|
| Initial live weight (gram)/bird | 90.20 | 90.40 | 90.30 |
| Final live weight (gram)/bird | 2300.26 | 2210.30 | 2250.15 |
| Daily live weight gain (gram)/bird | 38.34 | 36.84 | 37.50 |
| Total feed consumption(kg) | 198.00 | 200.00 | 210.00 |
| Feed conversion ratio(Feed: gain) | 2.60:1 | 2.70:1 | 2.82:1 |

Table 3. Average feed cost of broiler in different dietary treatment

| Costing | T1 | T2 | T3 |
|---|---|---|---|
| Cost/kg mixed feed(TK.) | 40.10 | 34.32 | 22.85 |
| Feed cost/chick/8 wks(Tk.) | 239.80 | 203.92 | 140.76 |

The mortality of chicks in different treatment groups was nearly same revealing that there were no significant threats to the chicks (Table 5). Because the diarrhea, inappetence and other food-borne ailments were not observed, the unconventional feed was digestible and safe for the chicks. Mortality recorded was 2 out of 33 chicks (6.06 %) in the treatment group 1. In the treatment group 2 and 3, the mortality recorded was 3 out of 33 chicks (9.09%). The mortality rates in different treatment groups were considered normal. Moreover, mortality of treatment group 2 was the same as the treatment group 3. Although slightly higher than 1, mortality of treatment group 2 and 3 was within the normal range.

Table 4. Feed cost of trial diets for Broiler

| | Total costs for different treatment diets | | |
|---|---|---|---|
| Price of different ingredients | T1 | T2 | T3 |
| Wheat @Tk 25/kg | 1225 | 1212 | 500 |
| Rice polish @Tk 35/kg | 560 | 700 | 700 |
| Til oil cake @Tk 35/kg | 490 | 420 | 350 |
| Fish meal @Tk 50/kg | 700 | 500 | |
| Blood meal @Tk 20/kg | --- | 80 | 200 |
| Shoti @Tk 5/kg | --- | 10 | 75 |
| Poultry droppings @Tk 5/kg | --- | --- | 75 |
| Mollasses @Tk 20/kg | --- | --- | 150 |
| Cod liver oil @Tk 150/kg | 450 | --- | --- |
| Common salt @Tk 20/kg | 10 | 10 | 10 |
| Vitamin @Tk 300/kg | 450 | 300 | 150 |
| Additives @Tk 100/kg | 100 | 200 | 50 |
| DCP @Tk 25/kg | 25 | --- | 25 |
| Total costs per 100kg feed | 4010 | 3432.5 | 2285 |

Table 5. Mortality of broiler during experiment period

| Number and mortality of chicks | Number and mortality in treatment group 1(T1) | Number and mortality in treatment group 2(T2) | Number and mortality in treatment group (T3) |
|---|---|---|---|
| Initial no. of chick | 33 | 33 | 33 |
| No. of chick died | 2 | 3 | 3 |
| Mortality% | 6.1 | 9.1 | 9.1 |
| No. of chick survived | 31 | 30 | 30 |

Hematological value was determined by differential count of whole blood taken from the broiler of treatment group 1 and 2 (Table 6). The cells of granulocytes and agranulocytes were not found to differ significantly.

Table 6. Differential count of blood of broiler

| Treatment groups | | Lymphocyte (%) | Monocyte (%) | Eosinophil (%) | Basophil (%) | Neutrophil (%) |
|---|---|---|---|---|---|---|
| T1 | I/F | 50.00 | 10.00 | 2.00 | 1.00 | 30.00 |
| | F/F | 52.00 | 9.00 | 1.80 | 1.50 | 31.00 |
| T2 | I/F | 52.00 | 10.20 | 1.70 | 1.80 | 31.00 |
| | F/F | 55.00 | 10.00 | 1.70 | 1.30 | 44.00 |

I/F=Initial findings, F/F=Final findings

**Discussion**

The body weight gain and feed conversion ratio between T1 and T3 show no significant difference, but there were significant different in production cost. Among the trial diets, T1 contained most conventional feed items which were not only costly but also unavailable in the rural area of the country. Additionally, it required higher transport cost increasing the broiler production cost and hence risk of losing capital. Although feed conversion ratio was slightly better than others, this did not reduce the production cost as the conventional items were costly. Unconventional items were added in the treatment group 2(T2) and treatment group 3(T3) with more items in the treatment group 3 (T3) which were cheap and readily available in the rural area. It was found that feed cost and thus, broiler production cost was decreased with the addition of unconventional feed ingredients. With the unconventional feed ingredients costing BDT.3432.50 and BDT.2285 per 100 kg of feed for the group T2 and T3, the production costs were greatly reduced and it was nearly half in the treatment group 3 (T3). Although chick mortality in these groups is slightly higher than control group, this was not significant as the costing of feed was too low considering the feed costing of control group. On the other hands, this mortality was same in between these two groups revealing that unconventional items had little or no side effects. V. Ravindran and H.W. Cyril (1995) successfully used unconventional feedstuffs in small farm level in Sri Lanka and they found no adverse effect in the birds. Thus, this findings are in consistence with them. The hematological values of the control group and treatment group also support the statement. The entire trial ration contained both the conventional and unconventional feed items in order to formulate balance ration. Similar kinds of studies on unconventional feed stuffs had been performed by many investigators (Latif *et al.*, 1976; 1978; Banerjee 1988). Differential count shows no significant changes in hematological values (Table 6). Similar results were observed by Ahmed *et al.* (1994) and Donkoh *et al.* (1999).

Unconventional feed ingredients were less costly than conventional item. Unconventional poultry ration in proper quantity may formulate balance diet economically and from this ration no pernicious effects observed on body weight gain, feed consumption, feed efficiency and health of the birds. From the above finding it can be concluded that unconventional ingredients in proper quantity may formulate balance ration economically.

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