

Article

Effect of sugar beet mixed feed for fattening of Jinding male duck available in Khulna, Bangladesh

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Abstract: This study was aimed to economic evaluation of using of sugar beet for fattening Jinding duck. A total number of 160, male one day old, Jinding ducklings were used in this study. All ducks were weighed individually and distributed randomly among 4 treatments, each treatment includes 40 ducklings were nearly similar in initial average body weights and each treatment was 4 blocks of 13 ducklings. Chemical analysis for rations was applied and different productive and economic measures applied. The results showed significant differences ($p>0.05$) among all groups for the final body weight where the control groups it was 389.40 ± 251.87 gram and for T2, T3, and T4 the final body weight were 641.93 ± 503.98 , 693.55 ± 500.33 , 693.55 ± 500.33 respectively. And also there were significant differences ($p<0.05$) among all groups for the total feed intake were at the control groups it was 903.83 ± 467.34 and for the T2, T3, and T4 for the total feed intake were 792.70 ± 483.25 , 845.60 ± 471.20 and 833.98 ± 465.28 gram respectively. The feed conversion rate showed significant difference ($p<0.05$) among all groups where at the control groups it was 3.049, and for T2, T3 and T4 the feed conversion rate were 1.836, 1.615, 1.779 respectively. The highest gross margin and Benefit Cost Ratio (Tk.153.19/per duck and 1.47 respectively) were obtained from T2 and the lowest (Tk. 122.78/duck and 1.35 respectively) from T4. Finally, we concluded that the using of sugar beet as a percentage with the concentrate feed has no side effect on the final growth weight of the Jinding ducks and through this research work the 10% is more economic than 20 % and 15% so we concluded that using sugar beet with 10% of the total concentrate feed to the ration of the Jinding ducks but FCR was found in 15% sugar beet mixed feed better.

Keywords: Jinding ducklings; sugar beet; feed conversion rate; gross margin

1. Introduction

Agriculture is the largest employment sector in Bangladesh. As of 2016, it employs 47% of the total labour force and comprises 16% of the country's GDP.

Contribution of Livestock in Gross Domestic Product (GDP), (2015-16) p 1.66%, GDP growth rate of Livestock (2015-16) p 3.21 %, Share of Livestock in Agricultural GDP (2015-16) p 14.21%. Duck production (2015-2016) 522.40 lakh. Employment (Directly) 20% Employment (Partly) 50% Cultivation of land by livestock 50% Fuel supply from livestock and poultry 25%. The poultry meat alone contributes a substantial 37% of the total meat production in Bangladesh (Begum *et al.*, 2011).

Duck have a remarkably rapid growth during the first weeks of life. At slaughter age of 7 weeks in Pekin ducks, 10 to 12 weeks in Muscovy ducks and 10 weeks in contrary to a wide spread opinion, there is no increase of fat content up to the usual slaughtering age of ducks shortly before the first youth moulting. From the beginning ducks have a percentage of skin with subcutaneous fat for protection against cold water.

The livestock sector is one of the major pillars of Bangladesh's economy. Contribution of the sector to total GDP is 7.73 percent. This labor intensive and fast income generating sector also significantly contribute to poverty reduction and foreign currency earnings through employment generation for the poor and marginal people as well as boost up exports. Besides, more than 90 percent of animal protein comes from fisheries and livestock sub-sectors.

Bangladesh is a densely populated country and agriculture is the main source of income for the population. Majority of the people of this country is suffering from malnutrition, particularly for the shortage of animal protein. According to report of BBS (1998) average per capita availability of meat is 12.5 g/day. Whereas per capita requirement of meat is 120 gm/day. Poultry production is the effective way to bridge this nutritional gap as a faster rate than other sources. The supply and demand gap of animal protein can be met by increasing production of poultry meat and eggs. Among poultry, ducks can be more easily brooded, need less care and are less suspected to diseases than the chicken (Modak, 1996).

There are about 85 million chickens and 33 million ducks in Bangladesh and about 85% of these birds are raised in the backyards (FAO, 1989). It is evident that 78% of poultry eggs and 86% of poultry meat is produced by the smallholding farmers (Alam, 1995). Duck rearing would increase the employment opportunity and subsidiary income of the rural women, land less and marginal farmers. Increase duck rearing would not interfere with chicken rearing due to different rearing and scavenging venue. That's why ducking would be a great supplement to total poultry production (Fedus, 1999).

Feed cost is the largest single item in the poultry production and accounts for 60 to 75% of the total production cost much emphasis has been placed on least cost formulation and getting the lowest feed cost per unit of salable product sugar beet.

Feed cost has a major impact on the profitability of poultry farm operations. The high cost of animal products to provide adequate quantities of animal protein. The shortage of feed stuffs is one of the major limiting factors for increasing animal production. Sugar beet has been demonstrated as additional energy source for poultry.

Sugar beet is considered as high grade with respect to ME content as 3344 Kcal and its crude protein content 14-16% on dry matter basis.

The objective of the study was to economic evaluation of unconventional ration (Sugar beet) for Jinding duck production and studies their effect on the productive performance traits that included final body weight, feed conversion rate and feed efficiency. And also from economic point evaluate the efficiency of percent of sugar beet addition in the ration.

2. Materials and Methods

The study was carried out during the period from August to November, 2016.

The experiment conducted with 160 Jinding male ducklings under 16 farmers condition in Dumuria and Satkhira to investigate the comparative performance of three different feed rations up to the 12 weeks of age. Of the 16 farmers involved in this study, 8 from polder 29 and other 8 from polder 2. While 160 ducklings be studied, the experiment started with 208 ducklings in order to have a safe margin in case of mortality of ducklings.

A total of 16 farmer families selected randomly on the basis of their interest and experience with duck rearing. Every farmer got 13 ducklings and the required feed as per study design. Average weight was recorded and distributed randomly among 4 treatments and each treatment included 52 ducklings were nearly similar in weight.

2.1. Data collection

Rations were formulated to contain approximately the same crude protein level, and energy (Kcal/kg). Four treatments were used: T1 (controlled), fed traditional feed for group (1), T2, 10% sugar beet mix fed for group (2), T3, 15% sugar beet mix fed for group (3), T4, 20% sugar beet mix fed for group (4). Four experimental starter diets (1 day to 42 days) as shown in Table 1 and finisher diets (from 43 days to 90 days) as shown in Table 2 were fed to ducklings and chemical composition of experimental diets is presented Table 3.

Table 1. Experimental diets used in the starter stage from 1 week to 7 weeks.

| Items | Control | 10% SB mix | 15% SB mix | 20% SB mix |
|-------------------------|-------------------|------------|------------|------------|
| Maize | | 48 | 43 | 43 |
| Sugar beet | | 10 | 15 | 20 |
| Rice polish | | 20 | 20 | 15 |
| Protein concentrate 60% | As farmers choice | 6.5 | 6.5 | 6.5 |
| Soya bean meal | | 14 | 14 | 14 |
| DCP | | 0.5 | 0.5 | 0.5 |
| Salt | | 1 | 1 | 1 |

Table 2. Experimental diets used in the finisher stage from 7 week to 12 weeks.

| Items | Control | 10% SB mix | 15% SB mix | 20% SB mix |
|-------------------------|-------------------|------------|------------|------------|
| Maize | | 47 | 44 | 44 |
| Sugar beet | | 10 | 15 | 20 |
| Rice polish | | 22.5 | 19.5 | 14.5 |
| Protein concentrate 60% | As farmers choice | 5 | 6 | 6 |
| Soya bean meal | | 14 | 14 | 14 |
| DCP | | 0.5 | 0.5 | 0.5 |
| Salt | | 1 | 1 | 1 |

Table 3. Proximate analysis of different samples.

| Sample No. | Protein% | Moisture% | Ash% |
|------------|----------|-----------|-------|
| T2 | 17.06 | 11.83 | 11.69 |
| T3 | 16.93 | 11.05 | 9.62 |
| T4 | 16.79 | 10.46 | 12.00 |

3. Results and Discussion

Table 4 showed no significant difference ($p > 0.05$) among all groups for the initial body weight were at the control groups it was 43.00 gram and for T2, T3, and T4 the initial body weight were 43.00, 43.00 and 43.00 gram respectively.

Also in Table 4 revealed significant difference ($p < 0.05$) among all groups for average final body weight where at the control groups it was 389.40 ± 251.87 gram, and for T2, T3 and T4 the average final body weight were 641.93 ± 503.98 , 693.55 ± 500.33 and 669.27 ± 518.61 gram respectively.

This result indicates the significance using sugar beet at 15% for the group three more than 10% and 20%. And the highly final growth rate in this group may be due to high sugar content in the starter and finisher ration as compared with other groups.

Table 5 showed significant difference ($p < 0.05$) among all groups for the average feed intake where at the control groups it was 903.83 ± 467.34 , and for T2, T3 and T4 average feed intake were 792.70 ± 483.25 , 845.60 ± 471.20 and 833.98 ± 465.28 gram respectively.

This result indicate the significance difference among all groups in the amount of average feed intake and as show the higher body weight gain in T3 are due to the high feed intake.

In the Table 6 showed significant difference ($p < 0.05$) among all groups for the feed conversion rate where at the control group it was 3.049 and for T2, T3, and T4 the feed conversion rate were 1.836, 1.615 and 1.779 respectively. It is indicated that over all feed conversion rate is better in T3 where using significance using of 15 percent of sugar beet mixed feed for the point of productive performances.

In case of feed efficiency as shown in Table 7 there is non significance difference ($p > 0.05$) among different groups where the lower one was in the treatment 1 (0.412) and the higher were in treatment 2, 4 and treatment 3 were 0.680, 0.700 and 0.729 respectively.

In case of gross marginal calculation, the ducklings revealed differences among them from 1st week to 12 week of ages (Table 4). Highest production cost found 20% sugar beet mixed feed and lowest from 10% mixed. The highest gross margin and Benefit Cost Ratio (Tk.153.19/per duck and 1.47 respectively) were obtained from T2 and the lowest (Tk. 122.78/duck and 1.35 respectively) from T4. This is due to variation of body weight gain on different sugar beet mixed feed effect. From the results it may be concluded that 10% sugar beet mixed feed will be more profitable.

Table 4. Body weights (g/ducklings/wks.) of different treatment of ducklings at different ages.

| Treatments | Age (weeks) | | | | | | | | | | | | Average wt. gain | |
|------------|-------------|-------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|------------------|--------|
| | Int | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th | 10th | 11th | | 12th |
| T1 | 43 | 55.44 | 113.21 | 190.05 | 289.81 | 346.68 | 416.21 | 489.86 | 438.6 | 581.39 | 603.97 | 638.69 | 664.68 | 389.40 |
| T2 | 43 | 42.92 | 114.75 | 184.38 | 471.73 | 572.76 | 730.96 | 902.42 | 1011.44 | 1103.64 | 1232.44 | 1364.04 | 1585.04 | 641.93 |
| T3 | 43 | 56.51 | 135.11 | 200.84 | 462.61 | 563.11 | 724.28 | 817.71 | 1007.68 | 1172.28 | 1318.07 | 1291.82 | 1515.76 | 693.55 |
| T4 | 43 | 43.76 | 119.32 | 201.29 | 530.34 | 645.6 | 672.63 | 709.26 | 1011.8 | 1134.63 | 1389.91 | 1322.58 | 1542.04 | 669.27 |

Table 5. Feed consumption (g/ducklings/wk.) of different treatment of ducklings at different ages.

| Treatments | Feed intake Average (week) | | | | | | | | | | | |
|------------|----------------------------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|
| | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th | 10th | 11th | 12th |
| T1 | 284.00 | 291.00 | 414.04 | 682.43 | 703.70 | 1051.13 | 1092.00 | 1254.42 | 1357.81 | 1350.60 | 1394.92 | 1618.19 |
| T2 | 132.75 | 271.35 | 402.75 | 650.00 | 786.00 | 906.25 | 996.00 | 1080.72 | 1304.80 | 1411.76 | 1560.00 | 1582.16 |
| T3 | 125.50 | 270.59 | 408.06 | 646.20 | 758.64 | 911.30 | 999.24 | 1079.49 | 1290.00 | 1363.50 | 1516.00 | 1607.55 |
| T4 | 133.49 | 263.83 | 404.19 | 651.15 | 815.74 | 899.78 | 966.74 | 999.11 | 1285.83 | 1408.48 | 1501.33 | 1572.14 |

Table 6. Feed conversion ratio (average) (g/ducklings/wk.) of different treatment of ducklings at different ages.

| Treatments | FCR (weeks) | | | | | | | | | | | | FCR (Average) |
|------------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|
| | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th | 10th | 11th | 12th | |
| T1 | 6.340 | 3.653 | 2.639 | 2.583 | 2.248 | 3.048 | 2.422 | 2.602 | 2.555 | 2.454 | 2.434 | 2.627 | 3.049 |
| T2 | 3.727 | 2.517 | 2.313 | 1.432 | 1.407 | 1.265 | 1.116 | 1.103 | 1.209 | 1.163 | 1.154 | 1.011 | 1.836 |
| T3 | 2.980 | 2.308 | 2.181 | 1.480 | 1.340 | 1.302 | 1.254 | 1.100 | 1.143 | 1.193 | 1.193 | 1.158 | 1.615 |
| T4 | 3.468 | 2.507 | 2.359 | 1.561 | 1.521 | 1.468 | 1.449 | 1.082 | 1.239 | 1.018 | 1.190 | 1.166 | 1.779 |

Table 7. Feed efficiency (g/ducklings/wk.) of different treatment of ducklings at different ages.

| Treatments | FE (weeks) | | | | | | | | | | | | FE (Average) |
|------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------|
| | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th | 10th | 11th | 12th | |
| T1 | 0.195 | 0.374 | 0.459 | 0.425 | 0.493 | 0.390 | 0.449 | 0.429 | 0.428 | 0.447 | 0.458 | 0.418 | 0.412 |
| T2 | 0.323 | 0.423 | 0.458 | 0.726 | 0.729 | 0.807 | 0.906 | 0.936 | 0.846 | 0.873 | 0.874 | 1.002 | 0.680 |
| T3 | 0.450 | 0.504 | 0.492 | 0.694 | 0.762 | 0.795 | 0.818 | 0.933 | 0.909 | 0.968 | 0.852 | 1.002 | 0.729 |
| T4 | 0.332 | 0.435 | 0.500 | 0.698 | 0.699 | 0.748 | 0.734 | 1.013 | 0.880 | 0.987 | 0.881 | 0.893 | 0.700 |

4. Conclusions

Finally, we concluded that the using of sugar beet as a percentage with ration has no side effect on the final growth weight of the Jinding ducks and through this research work 10% is more economic than 15% and 20%.

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Conflict of interest

None to declare.

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