International Journal of Natural and Social Sciences
Print: 2617-6637 < ISSN > Online: 2313-4461

Effect of pellet and mash feed on the production performance of Sonali chicken

Kunjo Roy[1], Mst. Afroza Khatun[2], Nipa Rani Sarker[3]*, Hosne Mobarak[3]

[1,2]Department of Dairy and Poultry Science, Hajee Mohammed Danesh Science and Technology University, Dinajpur-5200, Bangladesh
[3,4]Department of Genetics and Animal Breeding, Hajee Mohammed Danesh Science and Technology University, Dinajpur-5200, Bangladesh

ARTICLE INFO

Article history

Received: 11 April 2021
Accepted: 27 April 2021

Keywords

Sonali chicken, Pellet feed, Mash feed

***Corresponding Author**

Nipa Rani Sarker
nipa.bau02@gmail.com

ABSTRACT

This experiment was conducted to evaluate the efficacy of Mash and Pellet feed on the production performance of Sonali chicken in Bangladesh. A total of 176 day old chicks (DOC) were randomly assigned into two treatment groups, namely T_1andT_2 having four replications in each treatment group. Chicks were brooded up to 28 days then randomly separate into replication wise in a separated pen for rearing up to 11 weeks. Each treatment group contains 88 birds, whereas each replication contains 22 birds. Experimental birds in T_1 and T_2 were provided Pellet feed and Mash feed, respectively. The results of this study were indicated that the final live weight gain and feed conversion ratio (FCR) of birds found significantly ($p<0.05$) higher in T_1 group (814.33±14.38g) that received Pellet feed (T_1) compared to Mash feed group (T_2) (725.00±11.80g). This result also indicated that body weight gain and feed efficiency were increased at Pellet feed. The low feed cost found in T_2 and high in T_1 group. Net profit Tk. found maximum in T_2 (26.30±1.88) followed by T_1 (25.78±1.60).The present study concludes that Pellet feed is more economical than Mash feed.

INTRODUCTION

Poultry is one of the major components of livestock sub-sectors in Bangladesh that committed to supply cheap sources of good quality nutritious animal protein to the nation. Commercial poultry farming gains popularity, and employment opportunities are created for rural farmers, retailers, traders, service providers, entrepreneurs etc. (Saleque, 2009; Dolberg, 2008). Sonali birds are well adapted to the country's environmental conditions, so they require less care and attention than other breeds, making them easier for women and children to rear (Saleque and Saha, 2013). The share of commercial poultry production by the private sector is expanding rapidly in Bangladesh and now accounts for 50 percent of egg production and 60 percent of meat production (Bhuiyan, 2011).

Sonali chicken, the crossbred of Fayoumi female and RIR (Rhode Island Red) male developed in 1986, has been reported to perform better concerning egg and meat production. About 76 percent of Sonali beneficiary has improved their conditions by rearing this type of poultry (Hossen et al. 2012).

Feed form is an important factor that directly influences the cost of mixed feed and production performance of Sonali birds (Ghazi et al., 2012). The objective of the literature study was to review differences in energy consumption from different studies in the grinding and pelleting process and to describe how the digestion of nutrient in poultry feeds are influence by mash and pelleted feed**.** The physical form of a feed (mash or pellet) plays a crucial role in the meat yield of Sonali Chicken. However, previous researchers about the effects of feed forms and different feed access times on growth performance and cost-benefit of Sonali chickens. Therefore, this study was conducted to evaluate the growth performance and cost-benefit of Sonali chickens raised on mash and pellet diet accessed at different times. The aims of the study was to evaluate the growth performance and cost-

How to cite this article: Roy K, Khatun MA, Sarker NR and Mobarak H (2021). Effect of pellet and mash feed on the production performance of Sonali chicken. International Journal of Natural and Social Sciences, 8(1): 91-97. DOI: 10.5281/zenodo.4724966

effective analysis of Sonali chicken production by feeding Pellet and Mash feed,

MATERIALS AND METHODS

The experiment was conducted at the Dairy and Poultry Science farm of Hajee Mohammad Danesh Science and Technology University, Dinajpur, from 4thMay to 10thJuly 2020.One hundred seventy-six (176) vigorous day-old Sonali chicks were collected from poultry hatchery. The experiment was conducted in a complete randomized design (CRD). The chicks were randomly distributed to two dietary treatment groups ($T_1$and T_2), having four replications in each treatment. The chicks were reared in separated pens according to treatments and replications, and each dietary treatment group contains 22 birds (Table 1). Experiment shed was constructed with a compartment of housing for twenty-two birds. Each compartment was 85x70 inches for length and breadth, respectively. The shed was constructed with an iron net and wooden materials. The pellet feed (Nourish) were collected from the local market, and Mash feed was made by own in poultry farm.

Table 1: Experimental layout

Dietary Treatment	No. of chicks in each replication				Total number of chicks in each treatment
	R_1	R_2	R_3	R_4	
T_1	22	22	22	22	88
T_2	22	22	22	22	88
Total					176

T_1: Pellet form feed, T_2: mash feed

Table 2: Nutrient Composition of Sonali Starter

Chemical composition	Starter (Upto 14 days)
Moisture (%)	11-12
Crude protein (%)	21
Crude fiber (%)	5
Crude fat (%)	-
Ether extract (%)	4
Calcium (%)	1
Available phosphorus (%)	0.5
ME (Kcal/Kg)	2850

The experimental diet was divided into two phases (Sonali-starter, Sonali-grower) (Table 2 to 4). Sonali starter was provided 1 to 28 days, and Sonali grower was provided from 29 days to the end day of the experiment. Commercial Sonali-starter feed was provided up to 29 days of age. Then, the rest day of the experiment was supplied grower feed. The grower was two types- Pellet form and Mash form.

Table 3: Chemical composition of Sonali Grower

ME (Kcal/Kg)	Percentage (%)
Crude Protein	17
Crude Fiber	5
Ether Extract	4.63
Calcium	1
Phosphorus	0.42
Lysine	0.95
Methionine	0.40

To prepare Sonali Grower feed the following components were added: vitamin-mineral premix @ 250gm, Lysine @ 50gm, Methionine @ 50gm, Toxin Binder @ 150gm, Anti-Salmonella @ 150gm, Enzyme @ 50gm, Emulex @ 50gm and Maduramysin @ 50gm per 100 kg feed.

Table 4: Ingredients amount of formulated ration of Sonali Grower with their chemical Composition

Ingredients	Percentage (%)
Maize	56.2
Soybean	27
Rice Polish	9
Soybean Oil	1.5
DCP	0.5
Propec	3.74
Oyster Shell	0.9
Limestone	0.76
Salt	0.4
Total	100

Litter management

Fresh and dried rice husk was used as litter at a depth of 2-3 inch. After five weeks, old litter was totally removed, and new litter was provided at the same depth. The litter was stirred with a rake one time per day from four weeks upto the last day of the experimental period. Each pen was 7×5 sq. ft. allocated for feeding, watering, and housing for 22 experimental birds.

Brooding management

Before the entrance of day-old chicks, fresh, dried litter was provided at depth 3 inches then covered by the newspaper. Pre-heating the brooding space and temperature adjust at 33 ± 2^0C. After the entrance, day-old chicks were provided vitamin C and glucose; one hour later feed was provided. On the first day, the temperature was maintained at 33 ± 2^0C, then gradually decreased to 1^0C per day. Temperature and humidity were recorded by using a clinical thermometer and hygrometer. Debeaking of the birds was done successfully by electric debeaker at the age of 42 days to reduce cannibalism and other external injuries.

Calculation

Total weight gain in (kg): This was computed as a group by subtracting the initial weight from the final weight.

Weight gain (gm) = Final weight – Initial weight
Total feed consumption (kg): The amount of feeds consumed by the birds from the start until the end of the experiment (70 days) .This was computed by adding the total feeds offered after the total left-over have been subtracted.

Feed consumption = Total feed offered – Total left over

Feed efficiency: This was obtained per treatment by dividing the total feed consumed by the total gain in weight. Feed efficiency is computed for the whole duration of the experiment (70 days).

Feed efficiency = Total feed consumed / Total gain in weight

Total cost of the total feed consumed (PhP): This was obtained by multiplying the cost of feed per kilogram to the total feed consumed.

Cost of the total feed consumed = Cost of feed per kilogram × Total feed consumed

Feed cost per kg gain of Sonali chicken (PhP): The feed cost per kilogram of gain in weight and this was computed as the price of feeds per kilogram multiplied by the total gain in weight.

Feed cost per kilogram gain = Price of feeds per kg × Total gain in weight

Mortality rate (%) = No. of dead chickens / Total no. of birds as a group × 100

Cost of production: This includes the cost of stocks, feeds and vitamins, electricity, and materials used.

Gross income: This was obtained as a group by multiplying the sum of the final weight of the birds by the price per kilogram of live weight.

Gross Income = Total weight of the birds (as a group) × Price per kilogram

Net income: This was obtained by subtracting the cost of production from the gross income.

Net income = Gross income – Cost of production

Data collection

Initial DOCs weight and after brooding weight of chicks were recorded. Weekly Body weight gain and feed intake were recorded replication wise in each treatment group on the last day of the week. Mortality was recorded daily if death occurred. Temperature and relative humidity were recorded three times a day.

Statistical analysis

The data of feed consumption and growth performance were recorded and analyzed by SPSS version-22 software by using one way ANOVA in accordance with the principles of Complete Randomized Design (CRD). All values were expressed as Mean ± SEM, and significance was determined when (P<0.05). Mean were compared among the treatment groups at the 0.5 level of significance by using Duncan multiple tests.

RESULT AND DISCUSSION

Weekly Body weight gain

At the start of the experiment, the average body weight of the birds did not differ significantly among the treatment group. Table 6 showed that after 28 days of age, the initial body weight of chicks of the two treatments was similar. The live weight of birds in 1st, 2nd, 3rd and 4th weeks did not significantly (P<0.05) vary among the treatment groups. The efficacy of Pellet feed and Mash feed upto 4th weeks showed live weight same. At 6th weeks, the highest values were found in T1 (711.51±10.66g) received Pellet feed and the lowest values were found in T2 (616.00±13.42g) Mash feed. Next week, the highest values were found in T_1 (814.33±14.38g) that was received Pellet feed and the lowest values were found in T_2 (725.00±11.80g) that received Mash feed. The result of this study clearly showed that Pellet feed provided live weight gain upto 7th weeks of age. Live weight of 6th and 7th weeks significantly (p<0.05) differed between two treatment groups. Live weight gain was significantly (p<0.05) highest in T_1 compared to T_2 group. However, the Pellet feed showed maximum live weight (814.33±14.38g), and minimum live weight was observed (725.00±11.80g) in T_2 treatment group at the terminal stage of the experiment. It is clearly stated that Pellet feed increase more live weight of Sonali Chicken Compare with Mash Feed. The significant effect of Pellet feed on body weight gains was found higher in the treated group compared to Mash feed group.

Table 6: Effect of supplementation of mash and pellet form of feed on weekly body weight and body weight gain of Sonali chicken

Parameter	T_1	T_2	Level of significance
4th Week	179.61±1.85	182.79±4.08	NS
5th week	216.87±2.38	215.18±1.90	NS
6th week	305.16±4.43	296.00±4.29	NS
7th week	371.05±4.80	360.97±6.91	NS
8th week	429.73±5.11	413.52±8.50	NS
9th week	528.39±7.43	498.14±11.74	NS
10th week	711.51±10.66	616.00±13.42	*
11th week	814.33±14.38	725.00±11.80	*

The mean values differs significantly, at least (p<0.05). All values indicate Mean ± Standard Error of mean. NS means statistically not significant, *Means significant at 5% level of significance (P<0.05).

Body weight gain

The initial body weight of Sonali chicks fed on two forms of feed was similar (p>0.05). Final live weight gain was statistically significant (p<0.05) between the two treatment groups. The highest body weight gain was attained in birds that received Pellet feed. However, Pellet feed group T_1 was significantly (p<0.05) higher body weight gain compared to Mash feed group T_2. The result of this study was indicated that Pellet feed (T_1)

induces the highest body weight gain compared to the Mash feed group at the end of the feeding trial.

Feed intake

The cumulative feed intake of Sonali chicken in two forms of feed treatment during experimental periods was almost statistically similar and the differences were insignificant (p>0.05) (Table 7). However, the lowest feed intake (1665.60±20.33g) was found in T_2 group. The birds of T_1 group showed higher feed intake (1735.26±13.54g) compared to others groups. Similarly, Bertechini et al., (1992) reported that pelleted diets gave greater feed intake than did mash forms. Moran (1990) and Nir et al. (1995) also showed that pellet diet increased feed intake in broilers.

Table 7: Effect of pellet and mash feed on feed intake (Weekly)

Parameter	T1	T2	Level of significance
5th Week	101.51±1.33	101.45±1.40	NS
6th week	201.47±2.38	201.64±1.95	NS
7th week	242.04±1.91	243.18±1.82	NS
8th week	266.02±1.50	257.84±1.33	NS
9th week	299.43±3.78	252.27±13.25	NS
10th week	283.86±4.10	278.52±9.98	NS
11th week	340.96±1.89	330.68±2.68	NS
Total feed intake	1735.29±2.08	1665.58±4.61	

Table 8: Effect of Pellet and Mash Feed on feed intake and feed efficiency in Sonali chicken

Parameter	T1	T2	Level of significance
Feed intake	1735.26±13.54	1665.60±20.33	NS
FCR	2.13±0.02	2.29±0.016	*

The mean value significant, at least (p<0.05). All values indicate Mean±Standard Error of mean.NS means statistically not significant, *Means significant at 5% level of significance (P<0.05).

Table 9: Cost benefit analysis of pellet and mash feed treatments

Parameters (Tk.)	**T_1**	**T_2**	Level of significance
Chick cost	16	16	NS
Litter cost/chick	5	5	NS
Vaccine + medicine	10	10	NS
Miscellaneous cost/ chick	5	5	NS
Feed cost/ chick	69.31±4.79	53.33±4.57	NS
Total cost Tk./chick	105.31±4.79	89.33±4.57	*
Selling price Tk./chick	130.16±5.05	116.63±3.81	*
Net profit Tk./chick	24.85±1.60	27.30±1.88	*

Feed efficiency

Feed efficiency of different treatment groups during the experimental period statistically significant (P<0.05) (Table 8). The birds of T_1 groups containing Pellet feed converted feed to meat most efficiently than T_2 groups. The feed efficiency of T_1 treatment groups was statistically significant (P<0.05) in T_2 group. Feed efficiency was higher in the Pellet feed group (T_1). The highest feed conversion ratio (FCR) (2.29±0.016) was found in T_2 groups, and lowest feed conversion ratio (2.13±0.02) was found in T_1 groups. It is generally accepted that, compared to mash, the feeding of pellets improves chick growth rate with an increased feed intake. Similarly, Moran (1990) and Reece et al. (1986)

who reported that pellets had a better feed efficiency over mash.

Cost benefit analysis of production

Spending on feed, chick, vaccine, medicine, litter, miscellaneous (labour, electricity, transport cost) were constituted cost per chick (Table 9). The lowest total production cost per bird gain was (89.33±4.57Tk.) which found in T_2 group, and highest was found (105.31±4.79Tk.) in T_1 group. Total feed cost per chick in two treatments was found non-significant ($p>0.05$). The highest profit (27.30±1.88TK) was found in T_1 group and lowest (24.85±1.60Tk.) was found in T_2 group.

CONCLUSION

This study concluded that birds received Pellet feed.gained high body wieight and those received Mash feed gained low body weight. Spending on feed, chick, vaccine, medicine, litter, miscellaneous (labour, electricity, transport cost) were constituted cost per chick and cost per chick live weight. Total production cost per chick was (105.31±4.79Tk.) found in T_1 group and highest was found (89.33±4.57Tk.) in T_2 group. The study suggests using Pellet feed in Sonali chicken farm which is more economical than Mash feed.

REFERENCE

Asha RR, Thanabalan S, Narahari DKR, Hyoung Ho and Hoo CY (1996). Effects of Kumararaj, (1998a). Influence of season, form of feed and dietary energy levels on broiler performance. Indian Journal of Poultry Science .33: 36-41.

Asha RR, Kumararaj R, Narahari D, Ravindran R, Sundaresan K, (1998b). Indian Journal of Poultry Science, 33:346-348.

Bertechini AG, Rostagno HS and, Oliveira AIG (1992). Poultry Science, vol.18: 2965.

Bhuiyan N (2011). A framework for successful new product development. Journal of Industrial Engineering and Management, 4(4):746-770.

Hossain MK, Rahman M, Nahar A, Khair A and Alam MM (2013). Isolation and identification of diarrheagenic *Escherichia coli* causing colibacillosis in calf in selective areas of Bangladesh. Bangladesh Journal of Veterinary Medicine, 11(2): 145-149

Hossain MK, Rahman M, Nahar A, Khair A and Alam MM, Farghly MF, Afifi OS and Hassanien HH (2014). Effect of feed form on broiler chicks performance. In7th International Poultry Conference Nov 3 (pp. 3-6). Egypt: Ain Sukhna, Red Sea.

Farghly MF (2012). Effect of mash, pellets, crumbles and wet feed on performance of Japanese quail during the summer. Egyptian Journal of Nutrition and Feeds. 15(1):161-72.

Ghazi Sh, Habibian M, Moeini MM and Abdolmohammadi AR (2012). Effects of different levels of organic and inorganic chromium on growth performance and immunocompetence of broilers under heat stress. Biological Trace Element Research, 146(3):309-17.

Hossen MS, Hoque Z and Nahar BS (2015). Assessment of poultry waste management in trishal upazila, mymensingh. Research in Agriculture, Livestock and Fisheries, 2(2): 293-300.

Longpre J, Fairbrother JM, Fravalo P, Arsenault J, LeBel P, Laplante B, Surprenant C, Masse D and Letellier A (2016). Impact of mash feeding versus pellets on propionic/butyric acid levels and on total *Escherichia coli* load in the gastrointestinal tract of growing pigs. Journal of Animal Science,94(3):1053-63.

Moran ET, Jr, (1990). Effect of pellet quality on the performance of meat birds. Poultry Abstract.vol.16: 2875.

Nir I, Hillel R, PtichiI and Shefet G (1995). Poultry Science, 74: 771-783.

Pirzado SA, Mangsi A, Barham GS, Mari GM, Pirzado Z, Kalwar Q, (2015). Effect of mash and crumbled feed forms on the performance of broiler chickens. Journal of Agriculture and Veterinary Science, 8(12):27-30.

Rajput N, Naeem M, Ali S, Shah AM, Rizwana H, Shah AR and Jehejo AR (2016). Effect of Various Forms of Feed on Growth Performance of Japanese Quail. Sindh University Research Journal-SURJ (Science Series). 21;48(4).

Reece FN, Lott B and Deaton JN (1986). Poultry Science, 65: 636-641.

Saleque MA, Anisuzzaman M and Moslehuddin AZM (2009). Quantity-intensity relationships and potassium buffering capacity of four Ganges river floodplain soils. Communications in Soil Science and Plant Analysis, 40: 1333 - 1349.

Saleque MA and Saha AA (2013). Production and economic performance of small scale Sonali bird farming for meat production in Bangladesh. In Proceedings of the Semian, 8th International Poultry Show and Seminar, Dhaka, World Poultry Science Association Barach; pp 20-24.

Sarvestani TS, Dabiri N, Agah MJ and Norollahi H (2006). Effect of pellet and mash diets associated with biozyme enzyme on broilers performance. International Journal of Poultry Science, 5 (5):485-90.

Sena S, Sena L, Hoda A and Nikolla M (2014). Broiler Performance Fed on Mash vs. Pellets. Albanian Journal of Agricultural Sciences. 2 (353-356).