

Nutritional Quality of Feeds and Growth Performance of Broilers under Different Managemental Conditions in Mizoram

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Abstract – The study was for assessment of nutritional qualities of broiler feeds and growth performance of broilers under the existing rearing conditions in Mizoram. Sixty broiler farmers were randomly selected from two sub-divisions (Tlangnuam and Thingsulthliah) of Aizawl district of Mizoram for the study. Two rearing systems were identified – 1) Rearing of birds without any scientific considerations (*backyard*) and 2) Rearing of birds following scientific managemental practices (*scientific*). Thirty farmers from each sub-division i.e. fifteen each of rearing broilers under backyard and scientific respectively, were selected. The flock size observed to be significantly less under backyard rearing with more mortality of birds at 42nd day of age than scientific rearing. Feeds utilised were commercial broiler feeds of various brands. The nutritional composition of the feeds was found to be variable but conformed to BIS standards. The average feed consumption was significantly higher ($P < 0.05$) under backyard than scientific rearing. The body weight at 6th week of age was recorded as 1501.77 ± 30.19 g and 1944.00 ± 82.82 g, respectively with feed conversion ratio of 2.65 and 1.97 for backyard and scientific rearing. It was concluded from the observations that managemental condition significantly affected growth performance and feed efficiency of broilers. Adoption of scientific rearing practices with large flock size of broiler were suggested for the farmers of Mizoram to increase profit and thereby economic sustainability of farmers in Mizoram.

Keywords – Broiler Farming, Managemental Condition, Backyard, Scientific, Mizoram.

I. INTRODUCTION

Poultry farming plays pivotal role towards economic sustainability of the rural agrarian communities in Mizoram. The total poultry population of Mizoram was 12, 60,298 producing 1669 tonnes of meat which is 13.33% of total meat production of the state [5]. Broiler farming is a popular economic activity for financial return within a short period of time and requirements of minimum space and capital as compared to livestock enterprises. In recent years, Govt. of Mizoram has been providing financial supports to rural farmers through New Land Use Policy (NLUP) for broiler farming discouraging farmers for Jhum/shifting cultivation by destroying forest lands. There is also huge demand for broiler meat in the state and is the most popular meat next to pork in Mizoram.

Adequate feeding ensures optimal performance of broilers. Proper nutrition is vital for exploiting the full growth potentiality of broiler strains. In village condition, broiler farmers of Mizoram, for limited capital and assets,

rear broilers under backyard in small numbers. However, farmers adopting scientific rearing practices are also not uncommon rearing considerably large numbers of broilers. Therefore, considering the importance of broiler farming for economic sustainability and proper nutrition for optimum performance, an attempt was made for assessment of nutritional qualities of broiler feeds and growth performance of broilers under the existing rearing conditions in Mizoram.

II. MATERIALS AND METHODS

Selection of Respondents

For the study, surveys carried out on sixty numbers of randomly selected broiler farmers of two sub-divisions of Aizawl district, Mizoram namely, Tlangnuam and Thingsulthliah. In each sub-division, thirty broiler farmers were selected i.e. fifteen farmers with backyard production system and fifteen farmers adopting scientific management practices. The first group of farmers were designated as '*backyard*' and the second group as '*scientific*'. To make distinction between the two groups the following consideration were made –

- ✓ Farmers rearing broilers without any scientific considerations regarding housing, feeding and health care, vaccination etc. were considered as '*backyard*'.
- ✓ Farmers rearing broilers with scientific housing, feeding with adequate provision for light, drinking water, vaccination etc. were considered as '*scientific*'.

Information and Materials Collected

The following information and materials were collected from the farmers during the survey.

- 1). Total numbers of day-old-chick purchased per batch and numbers of birds survived per batch at 42nd day of age.
- 2). The total amount of pre-starter, starter and finisher feed utilised during the first six weeks of rearing.
- 3). Amount of feed utilised on 21st, 35th and 42nd day of age for feeding to broilers.
- 4). Sampling of broiler feeds were done following standard protocol for analysis of proximate principles.
- 5). Records of body weight at 21st, 35th and 42nd day of age.

Analytical Methods

The feed samples were analysed for proximate composition following methods of AOAC [2]. The feed conversion ratio (FCR) was calculated as: Body weight

(kg) at 6th week of age/Total amount of feed (pre-starter, starter and finisher) consumed during six week period.

Statistical Analysis

The data generated were subjected to student's t-test for interpretation of results.

III. RESULTS AND DISCUSSION



Fig. 1. Broiler farm
(scientific)



Fig. 2. Brooding of
chicks in village

The proximate composition of different broiler rations were presented in Table 1. As the farmers utilised commercial broiler feeds, the proximate composition of the rations under *backyard* and *scientific* management

were estimated to be similar. However, slight variations in nutritional composition might be for feeds of different brands/companies utilised by the farmers. The nutrient content of the rations were observed to be adequate as recommended by BIS [3] for broilers under both the rearing conditions. The energy content of the rations (calculated based of proximate principles) were higher than the amounts recommended by BIS [3] for broilers. Interestingly, the time periods for feeding different kinds of rations were different in different farmers. It was based on whatever the traders told to them. The farmers under backyard categories fed the broiler pre-starter from day 1 to about 7-10 days, the starter from about 8-11 day to 30-35 days and finisher feeds thereafter (70%) and some farmers (30%) utilised only starter and finisher feeds from day 1 to about 20-21 day and thereafter up to the marketing, respectively. The farmers under scientific categories were observed to take advice from the local field veterinarians or extension personnel regarding feeding of broilers and fed accordingly. All the farmers of the surveyed areas utilised commercial crumble/pelleted broiler feed, not mash feeds.

Table 1. Average nutritional composition (on DM basis) of broiler feeds.

Type of feed	Nutrient	Backyard	Scientific
Broiler pre-starter	Dry matter (%)	90.28	90.54
	Crude protein (%)	23.78	23.64
	Ether extract (%)	3.25	3.32
	Crude fibre (%)	4.14	4.22
	Total ash (%)	6.16	5.86
	*Metabolisable energy (Kcal/kg)	3783.29	3813.39
Broiler starter	Dry matter (%)	90.94	90.33
	Crude protein (%)	22.28	22.79
	Ether extract (%)	3.01	3.25
	Crude fibre (%)	4.46	4.53
	Total ash (%)	6.32	7.80
	*Metabolisable energy (Kcal/kg)	3697.64	3533.98
Broiler finisher	Dry matter (%)	89.37	89.79
	Crude protein (%)	20.35	20.34
	Ether extract (%)	1.88	2.11
	Crude fibre (%)	4.89	5.01
	Total ash (%)	4.83	5.26
	*Metabolisable energy (Kcal/kg)	3760.73	3708.53
*Calculated metabolizable energy [7]			



Fig. 3. A typical broiler house under
backyard

Total average mortality percentage of broilers was found to be higher under backyard than scientific rearing.

The flock size varied from 10-50 (23.33±10.63) and 50-200 (108.67±54.62), respectively in Tlangnuam sub-division with mortality of 6.94±6.10 and 3.52±1.33 percent, respectively for backyard and scientific rearing. The respective values for Thingsulthliah sub-division were 10-20 (15.33±3.99) and 50-200 (140.00±47.06) numbers; and 6.11±4.86 and 2.12±0.75 percent, respectively. The average flock size was considerably higher under scientific rearing; whereas, mortality rate was significantly (P<0.05) higher under backyard condition. Poor housing condition, feeding, sanitation might be the probable causes of higher mortality under backyard condition of rearing. Inclusion of kitchen wastes and unconventional leaves along with the commercial feeds by some farmers might also be another

probable cause of mortality of broiler under backyard rearing condition. Abera *et al.* [1] also reported 7.8% overall mortality in Cobb 500 commercial broilers under small-scale production in Western Ethiopia. Buragohain and Kalita [4] in their study on mortality pattern of broiler

under intensive management in Mizoram indicated that inadequate quality control system and poor drinking water quality might attributed to heavy mortality of broiler during their 4th to 5th week of age in Mizoram.

Table 2. Average flock size and mortality (%) of broilers under backyard and scientific management.

	Flock size (nos.)		Mortality (%)	
	Backyard	Scientific	Backyard	Scientific
Tlangnuam	23.33±10.63	108.67±54.62	6.94±6.10	3.52±1.33
Thingsulthliah	15.33±3.99	140.00±47.06	6.11±4.86	2.12±0.75
Average	19.33 ^a ±8.87	124.33 ^b ±52.56	6.52 ^p ±5.44	2.82 ^q ±1.28

Average means bearing different superscripts(a,b and p,q) differs significantly (P<0.05)

The total average feed intake of broilers under backyard and scientific rearing were recorded as 3235.75 g and 2979.48 g per bird for Tlangnuam and 3241.07g and 2989.84g per bird for Thingsulthliah sub-division up to 6th weeks of age, respectively. This indicated that feed consumption was reduced under scientific rearing which

could increase profit margin; being 60-70% cost of broiler enterprise is through feeding only. The average feed intakes of broilers at 21st day of age was significantly higher under scientific rearing, but on 35th and 42nd day of age it was significantly lower (P<0.05) than backyard rearing condition.

Table 3. Average feed intake (g/bird/day) and body weight (g) of broilers at 21st, 35th and 42nd day of age managed under backyard and scientific condition in Mizoram.

	Feed intake (g/bird/day)		Body weight (g)	
	Backyard	Scientific	Backyard	Scientific
At 21st day of age				
Tlangnuam	57.27±2.91	61.93±4.63	466.80±5.16	601.27±41.27
Thingsulthliah	57.20±3.46	60.93±3.95	465.13±5.62	616.00±48.07
Average	57.23^a±3.14	61.43^b±4.26	465.96^p±5.37	608.63^q±44.66
At 35th day of age				
Tlangnuam	142.93±5.47	104.07±3.41	1180.67±65.93	1314.67±30.67
Thingsulthliah	142.73±5.47	107.47±2.29	1175.07±36.64	1317.33±38.45
Average	142.83^a±5.38	105.77^b±3.34	1177.87^p±52.48	1316.00^q±34.20
At 42nd day of age				
Tlangnuam	167.70±3.92	150.73±9.78	1508.53±34.60	1910.00±85.02
Thingsulthliah	170.67±4.42	153.87±7.44	1495.00±24.35	1978.00±67.10
Average	169.13^a±4.39	152.30^b±8.69	1501.77^p±30.19	1944.00^q±82.82

Average means bearing different superscripts (a,b and p,q) differs significantly (P<0.05)

However, the recorded average body weights at 21st, 35th, and 42nd day of age were significantly (P<0.05) lower under backyard rearing than under scientific management. The average body weights at 42nd days of age were found to be 1501.77±30.19 g and 1944.00±82.82 g, respectively under backyard and scientific management. Fanai [6] reported significantly less average body weights of broilers at 6th week of age reared under backyard system than under intensive system of management in Mizoram. Renthlei [9] also reported significantly less average body

weight of broiler at 6th week of age under backyard system of management in Mizoram. The significantly lower body weight under backyard management might be for improper housing, feeding and health management which increased susceptibility to infections lowering the immunity of the birds. Inadequate light period and space might also be responsible for reduced growth rate of broilers under backyard rearing. This might be the reason (i.e. slow growth rate) why farmers of Mizoram rear broiler up to 12 weeks of age or more under backyard rearing.

Table 4. Average total feed consumption (gm/bird), body weight and FCR at 42nd day of age.

	Tlangnuam	Thingsulthliah	Average
Average feed consumption up to 42nd day of age (g/bird)			
Backyard	3976.00±81.67	3993.73±75.11	3984.86^a±77.62
Scientific	3812.66±157.00	3861.20±84.86	3836.93^b±126.43
Average body weight at 42nd day of age (g/bird)			
Backyard	1508.53±34.60	1495.00±24.36	1501.77^a±30.19
Scientific	1910.00±85.02	1978.00±67.10	1944.00^b±82.82
FCR at 42nd day of age			
Backyard	2.63±0.08	2.67±0.08	2.65^a±0.07
Scientific	1.99±0.11	1.95±0.09	1.97^b±0.10

Average means bearing different superscripts in column (a,b) differ significantly (P<0.05)

The approximate total feed intake were calculated on the basis of average feed intake of the birds as recorded on 21st, 35th and 42nd day of age. The FCR was calculated on the basis of calculated total feed intake and average body weight of birds at 42nd day of age. The calculated FCR was observed to be significantly higher ($P < 0.05$) for broiler under scientific management than under backyard rearing condition. Rahman *et al.* [8] also reported FCR 2.82 with meat: feed ratio 1.79:1 in broilers managed under backyard system of management in Mizoram. Significantly poor FCR under backyard management might be attributed to significantly poor growth rate and high feed consumption for unscientific feeding and management.

IV. CONCLUSION

From the observations of the study, it was concluded that managerial conditions significantly affects growth performance and feed efficiency of broilers. Thus, adoption of scientific rearing practices and rearing of more numbers of broiler/batch may be suggested to the farmers of Mizoram to increase profit and thereby economic sustainability of the family.

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