



Effect of different dietary protein level on the growth performance of broiler chickens

PRADEEP KUMAR, NAZIM ALI, RAJKUMAR, JAGDEEP KUMAR, MANOJ KUMAR BANSALA AND PRAVEEN KUMAR

ABSTRACT : The present study was conducted at Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut (India) to compare the growth performance of broiler chicken after feeding them on four dietary treatments *viz.*, T₁ (control) containing 22 per cent crude protein (CP), T₂ 85 per cent control diet + 7.5 per cent groundnut cake + 7.5 per cent fish meal (25 % CP), T₃ 83 per cent control diet + 8.5 per cent maize + 8.5 per cent wheat (20 % CP) and T₄ 66.5 per cent control diet + 33.5 per cent wheat (18 % CP). Average body weight gain of broiler chicks of 6 week age, fed control diet (22 % CP), 25, 20 and 18 per cent CP were reported 2062 ± 4.1, 2174 ± 4.9, 1875 ± 4.0 and 1780 ± 2.8 g against the feed consumption of 3727 ± 1.4, 4243.9 ± 20.7, 3432 ± 14.3 and 3396 ± 11.4g, respectively. The average FCR of control diet T₂, 25, T₃, 20 and T₄ 18 per cent CP were 1.94 ± 0.00, 1.83 ± 0.01, 1.89 ± 0.01 and 1.75 ± 0.07, respectively.

KEY WORDS : Broiler chick, Feed consumption, Body weight gain, FCR

HOW TO CITE THIS PAPER : Kumar, Pradeep, Ali, Nazim, Rajkumar, Kumar, Jagdeep, Bansala, Manoj Kumar and Kumar, Praveen (2015). Effect of different dietary protein level on the growth performance of broiler chickens. *Res. J. Animal Hus. & Dairy Sci.*, 6(1) : 48-51.

INTRODUCTION

In India there is a huge gap between demand and availability of poultry feeds in general and energy feeds in particular. The unusually high price of grains has forced the poultry farmers to search their substitutes *i.e.* traditionally groundnut cake, fish meal, wheat and maize grain. Maize is used as a main energy source in poultry diets but is costly (Raman *et al.*, 2010). The energy content of feeds like ground nut cake, maize and wheat can be increased by various processing techniques like grinding, cooking and reconstitution. The seed is quite digestible and palatability and gives more energy than cereals on equal weight basis when fed to the flock

(Neshein *et al.*, 1979). Animal proteins are often used in chick diet but due to the non-availability quality raw material of feed and escalating costs, alternative protein source need to be exploited. Large quantities of fish meal are generated in India from the fish processing plants, which include the skin, bone and viscera (Smitha *et al.*, 2006). Hence, the present study was undertaken to assess the effect of different dietary incorporation of protein on the growth and feed efficiency of broiler chicken.

MATERIAL AND METHODS

The present study was conducted at Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut (India) 2012 one day old 40 commercial broiler chicks (Cobb 400) were procured from Venky's Hatchery (Meerut) and reared for one week on deep litter and weighed individually. Birds were randomly divided into 4 groups with 10 birds in each after discarding too light and heavy weight birds. All the groups were reared on deep litter for a period of (1-6 week) during

MEMBERS OF RESEARCH FORUM

Address for correspondence :

Pradeep Kumar, Department of Animal Husbandry, Sardar Vallabhbhai Patel University of Agriculture and Technology, Modipuram, MEERUT (U.P.) INDIA

Associated Authors' :

Nazim Ali, Rajkumar, Jagdeep Kumar, Manoj Kumar Bansala and Praveen Kumar, Department of Animal Husbandry, Sardar Vallabhbhai Patel University of Agriculture and Technology, Modipuram, MEERUT (U.P.) INDIA

Table A : Chemical analysis of the broiler experimental diets

Sr. No.	Chemical constituents	Starter diet (%)	Finisher diet (%)
1.	Moisture	12.00	12.00
2.	Dry matter	88.00	88.00
3.	Ash content	7.00	7.00
4.	Crude fibre	5.00	5.00
5.	Crude protein	22.00	19.00
6.	Total fat	5.00	5.00
7.	Calcium	0.90	0.90
8.	Phosphorus	0.60	0.60

which standard management practices were adopted. The group one birds were fed control diet containing crude protein (CP) 22 per cent procured from Godrej (India). In rest three group changes in basal diet were made by replacing some basal diet with other feed forms. Group 2, 3 and 4 birds were fed with 25, 20 and 18 per cent CP consisting of 85 per cent control diet + 7.5 per cent GNC + 7.5 per cent fish meal, 83 per cent control diet + 8.5 per cent maize + 8.5 per cent wheat and 66.5 per cent control diet + 33.5 per cent wheat, respectively (Table A). They were formulated to have comparable protein and energy contents to meet design requirements (AOAC, 1990). Above mentioned ration were offered daily in the morning in individual cages upto 6 week age *ad libitum* and fresh clean drinking water was also provided *ad libitum*. Feed was provided linear chicks feeders upto 4 week age. The bucket type handling feeders were used during the finishing phase (4 to 6 week age). The lips of feeders were kept at level of shoulders of the birds to prevent feed wastage. The linear feeders were refilled twice a day upto 4 week age to avoid wastage. The birds were allowed to consume feed *ad libitum* throughout the experiment. Water was also provided *ad libitum*. Body weight gain and feed intake per replicate were recorded at weekly intervals. The efficiency of feed utilization was calculated as feed intake per unit weight gain. The data were subjected to statistical analysis under Completely Randomized Design employing

one way analysis of variance (Snedecor and Cochran, 1989).

RESULTS AND DISCUSSION

The average feed intake bird during the whole experimental period upto 6 week fed diet were found 3727 ± 1.4 , 4244 ± 20.7 , 3432 ± 14.3 and 3396 ± 11.4 g, respectively (Fig. 1, Table 1). The highest feed consumption was reported by the broiler chicks fed diet T_2 and lowest feed consumption by the broiler chicks fed diet T_4 . The feed consumption upto 6 week, ranged from 3395.80 ± 11.41 g (T_3 group) to 4243.90 ± 20.69 g (T_1 group), There are significant differences ($P < 0.05$) in feed

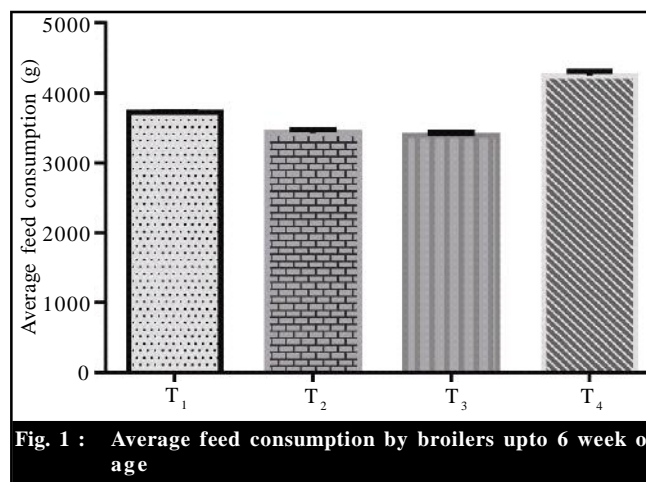


Fig. 1 : Average feed consumption by broilers upto 6 week of age

Table 1 : Average feed consumption, body weight gain and feed conversion ratio in (g) by chick broilers up to 6 week of age

Treatments	Parameters		
	Feed consumption (g)	Body weight gain (g)	Feed conversion ratio (g)
T ₁ (22 % CP) Control	3727.50±11.45	2062.00±4.07	1.75±0.07
T ₂ (25 % CP)	4243.90±20.69	2174.20±4.87	1.94±0.00
T ₃ (20 % CP)	3432.50±14.31	1875.40±3.97	1.83±0.01
T ₄ (18 % CP)	3395.80±11.41	1780.20±2.83	1.89±0.01
Average	3699.92±14.46	1972.95±3.93	1.85±0.02

consumption of broiler chicks among different treatment of diet fed to broiler chickens. These observations were corroborated by the report on feeding table also showed that feed consumption upto 6 week of ranged from 3395.80 ± 11.41 g (T_3 group) to 4243.90 ± 20.69 g (T_1 group). The significant differences ($P < 0.05$) exist in feed consumption of broiler chicks among different treatment of diet fed to broiler chickens. The highest feed consumption was observed for the group of chicks fed diet T_1 and lowest for the diet T_3 ; which could be inversely related to energy content of the diet T_1 (25%) and T_3 (18%). Since birds first take feed to satisfy their energy demand once their energy requirement satisfied, they stop feeding. Kavitha *et al.* (2003) reported that the average feed consumption ranged from 3570.4 to 3865.00 g per chicks fed different diets, while average value of feed consumption in present study was 3699.92 ± 13.83 g which is in between the above value. Hence, our results are in agreement with above study. (Grover *et al.*, 2010) Reported the average feed consumption during 0-6 week of age for commercial broiler ranged from 2506.0 to 2812.0 g. The average feed consumption was lower than present investigation. This may be due to effect of strain of broilers used in experiment and further may be due to effect of diet composition. (Shashipal *et al.*, 2010) Reported average feed consumption upto 6 week of ranges from 3445.4 to 3483.0 g per chicks with average value of 3460.96 g. Although feed intake value in present investigation for the T_2 , T_3 and T_4 group is slightly lower than the value of feed consumption was reported by (Shashipal *et al.*, 2010), but average value feed consumption is slightly higher this is due to higher feed consumption in present study for the T_1 .

The average body weight gain per bird during the whole experimental period upto 6 week of age fed diet T_1 , T_2 , T_3 and T_4 were found 2062 ± 4.07 , 2174.20 ± 4.87 , 1875.40 ± 3.97 and 1780.20 ± 2.83 g, respectively (Fig. 2, Table 1). Highest body weight gain was reported in the broiler chicks fed diet T_2 and lowest body weight gain in the broiler chicks fed diet T_4 the body weight upto 6 week ranged from 1780.20 ± 2.83 to 2174.20 ± 4.87 g. There are significant differences ($P < 0.05$) in body weight gain of broiler chicks among different treatment of diet fed to broiler chickens. Average body weight gain of broiler chicks upto 6 week of age for the group fed diet T_1 , T_2 , T_3 and T_4 was found 2174.20 ± 4.87 , 1875.40 ± 3.97 , 1780.20 ± 2.83 and 20.62 ± 4.07 g, respectively. The overall average body weight gains for T_1 , T_2 , T_3 and

T_4 was 1972.95 ± 4.00 g. Table also showed that body weight upto 6 week ranged from 1780.20 ± 2.83 g to 2174.20 ± 4.87 g. Significant differences ($P < 0.05$) were presented in body weight gain of broiler chicks among different treatment of diet fed to broiler chickens. Overall body weight gain upto 6 week of age was higher for the group fed diet T_1 . Since, there was inclusion of fish meal in diet T_1 ; the increase in growth may be due to inclusion fish meal. Karimi (2006) reported that inclusion of fish meal in diet increased daily body weight gain from 0-42 days significantly. Shashipal *et al.* (2010) reported body weight gain ranged from 1898.02 to 1920.38 g. Average body weight gain from 0-6 week's age was 1907.30 g per day. In present investigation the average body weight gain upto 6 weeks of age 1972.95 ± 4.00 g is slightly higher. This difference can be contributed due to difference in their genetic constitution. Grover *et al.* (2010) reported that average body weight gain was ranged from 1280.0 to 1440 g during 0-6 week of age. These values were lower than present investigation which may be due to variation in dietary ingredient and due to genetically potential of chick strain use for broiler production. Kavitha *et al.* (2003) conducted experiment on growth performance of broiler, body weight gain was reported from 1338.07 to 1791.07 g during 0-6 weeks of age with average weight gain was 1774.53 g. Mean value was lower than present investigation (1972.95 ± 4.00). This difference can be contributed by genetically potential of chicks.

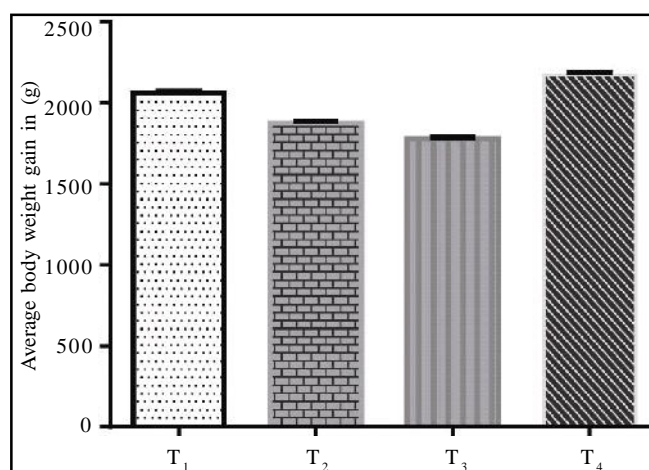


Fig. 2 : Average body weight gain in broilers upto 6 week of age

The average cumulative FCR was lowest on diet T_1 (control diet having 22 % CP) and highest on diet T_2 having 25 per cent CP (25 % control + 7.5 GNC + 7.5 fish meal) (Fig. 3, Table 1). There were no significance

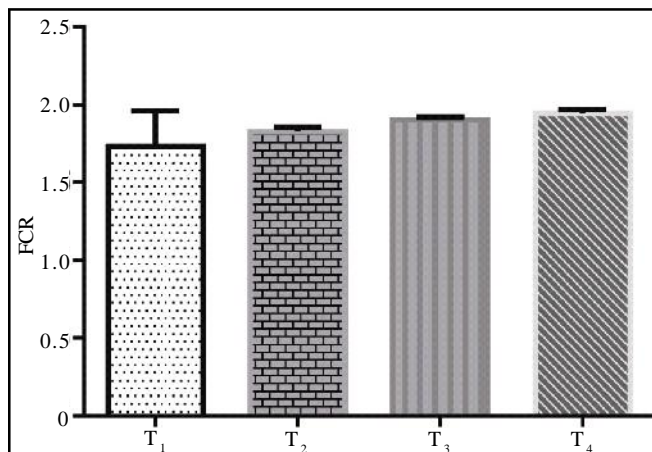


Fig. 3 : FCR in broiler chicks up to 6 week of age

difference ($P < 0.05$) in feed conversion ratio found among T₂, T₃ and T₄ diets. Feed conversion ratio ranged from 1.75 ± 0.07 to 1.94 ± 0.00 . All the treatments were non-significantly different from the control (T₁). These results are in close resemblance with the results reported by various workers. Average feed conversion ratio for growing chicks varied from 2.03 to 2.28 as reported Raman *et al.* (2010). In present investigation average value of feed conversion ratio ranged from 1.75 to 1.94 which is lower than reported by above scientist; this difference may be due to difference in composition of diet or it may be due to genetic improvement in chicks. Grover *et al.* (2010) reported that feed conversion ratio ranges from 1.86 to 1.95. These results are in agreement with present experiment. Kavitha *et al.* (2003) reported feed conversion efficiency of different diet fed to broiler chicks up to 6 week of age ranged from 2.03 to 2.14. Shashipal *et al.* (2010) also reported that feed consumption ranged from 1.99 to 2.00. This was higher than present experiment and this difference might be due to genetic improvement in chick strain.

Acknowledgement :

Author is thankful to Vice-Chancellor, SVP University of Agriculture and Technology, Meerut (U.P) India for his kind guidance, motivation and unconditional support for this work.

LITERATURE CITED

- A.O.A.C. (1990). *Official methods of analysis*. Association of official analytical chemists, WASHINGTON, D.C., U.S.A.
- Grover, R., Sethi, A.P.S. and Sikka, S.S. (2010). Response of herb jiwanti (*Leptidinia reticulata*) on growth performance and nutrient utilization in commercial broilers. *Indian J. Anim. Nutr.*, **27** (2) : 169-173.
- Karimi, A. (2006). The effects of varying fish meal inclusion levels on performance of broiler chicks. *Internat. J. Poult. Sci.*, **5** (3) : 255-258.
- Kavitha, P., Ramana, J.V., Prasad Rama, J., Reddy, P.S. and Reddy, P.V.V.S. (2003). Inclusion of dried tomato (*Lycopersicon esculentum*) pomace in broiler diets on growth performance and carcass characteristics. *Indian J. Ani. Nutr.*, **20** (4) : 436-442.
- Neshein, M.C., Austic, R.E and Card, L.E. (1979). *Poultry Production* (12th Ed.). Lea and Febiger Philadelphia, USA.
- Raman, R.S., Lohan, O.P. and Sihag, Z.S. (2010). Effect of replacing maize with processed bajra and wheat on the growth performance in broilers. *Indian J. Anim. Nutr.*, **27** (3) : 309-313.
- Shashipal, Sharma, A. and Singh, R. (2010). Effect of dietary protein levels on growth performance, carcass characteristics and economics of broiler production. *Indian J. Anim. Nutr.*, **27** (1) : 56-59.
- Smitha, N.F., Mercy, A.D., Viswanathan, T.V. and Mercy, K.A. (2006). Effect of replacing fish meal with fish waste silage on the performance of broilers. *Indian J. Anim. Nutr.*, **23** (2) : 125-127.
- Snedecor, G.W and Cochran, W.G. (1989). *Statistical Methods* (8th Ed.). Iowa State University Press, Ames, IOWA, USA.

Received : 11.02.2015; Revised: 23.04.2015; Accepted : 24.05.2015