



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; SP-12(7): 371-373
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www.thepharmajournal.com
Received: 01-04-2023
Accepted: 05-05-2023

Divya V
Veterinary Surgeon, Clinical Laboratory, District Veterinary Centre, Department of Animal Husbandry, Palakkad, Kerala, India

Sankaralingam S
Assistant professor & Senior Scientist, All India Coordinated Research Project (AICRP) on Poultry for Eggs, Mannuthy, Thrissur, Kerala, India

Anitha P
Professor and Head, Department of Poultry Science, College of Veterinary and Animal Sciences, Mannuthy, Thrissur, Kerala, India

Influence of varying levels of dietary protein and energy on growth performance of Gramasree cockerels at 12 weeks of age

Divya V, Sankaralingam S and Anitha P

Abstract

This study was undertaken at University Poultry and Duck Farm, Mannuthy, Thrissur, Kerala to investigate the effects of varying levels of dietary protein and energy on growth performance and carcass characteristics of Gramasree male birds reared from 0-12 weeks of age. 288 day-old Gramasree male chicks were randomly assigned to 6 dietary treatments in a 3x2 factorial experiment with three levels of dietary proteins (22, 20 and 18 percent CP) and two levels of energy (3100 and 2800 kcal ME/ kg). At the end of 12 weeks of age, the mean cumulative body weight gain and cumulative feed consumption was significantly ($p \leq 0.05$) higher in birds fed with diet containing 20 percent CP and 2800 kcal ME/ kg. The birds fed with higher protein diets (22 and 20% CP) showed significantly ($p \leq 0.05$) higher body weight gain. The birds fed with 2800 kcal ME/ kg had significantly ($p \leq 0.05$) higher feed consumption. Among different protein levels, significantly ($p \leq 0.01$) better cumulative FCR was observed in birds fed with diet containing 22 and 20 percent CP. Significantly ($p \leq 0.01$) better cumulative FCR was observed in diet containing 3100 kcal ME/ kg. In conclusion, protein level in the diet at 20 percent CP and energy level at 3100 kcal ME/ kg were met the growth requirement of Gramasree cockerels.

Keywords: Gramasree, factorial, protein, energy

1. Introduction

Gramasree is a synthetic dual purpose coloured breed of chicken developed at University Poultry and Duck Farm (UPDF), Mannuthy in the year 2005 for backyard purpose. It is having the germplasm of indigenous Naked Neck, New Hampshire, Plymouth Rock and Rhode Island Red breeds of chicken. Gramasree cockerel rearing is gaining much popularity among the poultry farmers of Kerala. At present there is no available scientific information regarding the nutrient requirement of Gramasree cockerels for meat purpose so the farmers are giving high protein and high energy diets like broiler starter for first two months of age and broiler finisher thereafter. The birds are grown for 2½ to 3 months of age and sold for meat when they reach around 2 kg body weight. It leads to wastage of protein and energy which are highly expensive and increase the cost of production. The present study was conducted to find the requirement of optimum metabolizable energy and crude protein for the growth of this bird.

2. Materials and Methods

288 day-old Gramasree male chicks belonging to a single hatch were weighed individually, wing banded and randomly assigned to six dietary treatment groups having 4 replicates of 12 birds each. The dietary treatments were in a factorial arrangement with 3 levels of protein (22, 20 and 18 percent CP) and 2 energy levels (3100 and 2800 kcal ME/ kg diet). The dietary treatments were as follows:

- T1-22 percent CP and 3100 kcal ME/ kg.
- T2-20 percent CP and 3100 kcal ME/ kg.
- T3-18 percent CP and 3100 kcal ME/ kg.
- T4-22 percent CP and 2800 kcal ME/ kg.
- T5-20 percent CP and 2800 kcal ME/ kg.
- T6-18 percent CP and 2800 kcal ME/ kg.

All chicks were reared under uniform conditions of management under deep litter system. Feed and water were provided *ad libitum* from 0-12 weeks of age. At the end of 12 weeks of age the body weight of each bird and feed consumption in each treatment were measured.

Corresponding Author:

Divya V
Veterinary Surgeon, Clinical Laboratory, District Veterinary Centre, Department of Animal Husbandry, Palakkad, Kerala, India

The observations recorded were body weight gain and feed consumption. FCR (feed conversion ratio) was calculated based on these two data. Data collected on various parameters analysed statistically using 3x2 factorial design as described by Snedecor and Cochran (1994) and significant differences were spotted by applying Duncan's Multiple Range Test (Duncan, 1955).

3. Results and Discussion

3.1 Effect of protein x energy interaction on different dietary treatment combinations on mean (±SE) cumulative body weight gain (g), feed consumption (g) and FCR

The mean (±SE) cumulative body weight gain (g), feed consumption (g) and FCR of Gramasree cockerels in different dietary treatment combinations at 12th week of age were shown in Table 1. The F-value for protein x energy interaction (different dietary groups) was found to be significant for mean cumulative body weight gain (g), feed consumption (g) and FCR. At the end of 12 weeks of age, the mean cumulative body weight gain and cumulative feed consumption was significantly ($p \leq 0.05$) higher at birds in T5 (birds fed with diet containing 20 percent CP and 2800 kcal ME/ kg). But no significant difference was observed on mean cumulative FCR on different dietary treatment combinations [1].

3.2 Effect of different levels of dietary protein on mean (±SE) cumulative body weight gain (g), feed consumption (g) and FCR of Gramasree cockerels at 12th week of age

Details regarding these observations was presented in Table 2. The F-value for comparison between three levels of protein was found to be significant for mean cumulative body weight gain (g), feed consumption (g) and FCR. Effect of different

levels of protein on mean cumulative body weight gain revealed that the birds fed with diet containing 22 and 20 percent CP had significantly ($p \leq 0.05$) higher body weight gain compared to diet with 18 percent CP. The birds fed with high and medium protein diet showed higher body weight gain and this might be due to the availability of sufficient amino acids for growth. This result concluded that Gramasree cockerels might be fed with 20 percent CP for better growth than going for 22 percent CP which will increase the cost of feed. However, the individual effect of different protein levels on cumulative feed consumption was found to be non-significant at this age and this result was in agreement with findings of many researchers [2, 3]. The birds fed with diet containing 22 and 20 percent CP had significantly ($p \leq 0.05$) better FCR [4]. The poor FCR in group fed with 18 percent CP might be due to low availability of amino acids for growth. Based on these observations, it is advisable to go for 20 percent CP to get more profit.

Table 1: Mean (±SE) cumulative body weight gain (g), feed consumption (g) and FCR of Gramasree cockerels in different dietary treatment combinations at 12th week of age

Treatment	Cumulative body weight gain	Cumulative feed consumption	Cumulative FCR
T1	1418.21 ^{ab} ±26.01	3633.33 ^b ±126.83	2.56±0.12
T2	1369.99 ^{bc} ±08.00	3469.31 ^c ±56.85	2.53±0.05
T3	1262.71 ^d ±14.50	3992.30 ^b ±181.43	3.16±0.12
T4	1345.30 ^c ±12.24	3958.36 ^b ±93.78	2.94±0.05
T5	1466.55 ^a ±14.75	4582.98 ^a ±105.05	3.13±0.08
T6	1160.78 ^c ±38.31	3843.41 ^b ±110.14	3.31±0.14
F-Value	12.41 ^{**}	14.497 ^{**}	2.331 ^{ns}
p-Value	0.001	0.001	0.126

** Highly significant ($p < 0.01$) ns= non-significant
Means bearing same superscripts do not differ significantly within a column

Table 2: Effect of different levels of dietary protein on mean (±SE) cumulative body weight gain (g), feed consumption (g) and FCR of Gramasree cockerels at 12th week of age

Protein (%)	Cumulative body weight gain	Cumulative feed consumption	Cumulative FCR
22	1381.75 ^a ±19.11	3795.85±95.42	2.75 ^b ±0.01
20	1418.28 ^a ±19.83	4026.14±217.60	2.83 ^b ±0.12
18	1211.75 ^b ±27.03	3917.84±102.20	3.24 ^a ±0.09
F-Value	52.472 ^{**}	1.892 ^{ns}	13.707 ^{**}
p-Value	0.001	0.18	0.001

** Highly significant ($p < 0.01$) ns= non-significant
Means bearing same superscripts do not differ significantly within a column

Table 3: Effect of different levels of dietary energy on mean (±SE) cumulative body weight gain (g), feed consumption (g) and FCR of Gramasree cockerels at 12th week of age

Energy (kcal ME/ kg diet)	Cumulative body weight gain	Cumulative feed consumption	Cumulative FCR
3100	1350.31±21.78	3698.32±95.31	2.75±0.10
2800	1324.21±40.03	4128.24±11.82	3.13±0.07
F-Value	2.206 ^{ns}	19.762 ^{**}	21.37 ^{**}
p-Value	0.155	0.01	0.001

** Highly significant ($p < 0.01$) ns= non-significant
Means bearing same superscripts do not differ significantly within a column

3.3 Effect of different levels of dietary energy on mean (±SE) cumulative body weight gain (g), feed consumption (g) and FCR of Gramasree cockerels at 12th week of age

Details regarding these observations was presented in Table 3. The F-value for comparison between energy levels was found to be significant for mean cumulative body weight gain (g),

feed consumption (g) and FCR. Based on the observation, different dietary energy level had no significant effect on cumulative body weight gain [5]. But at 12th week, birds fed with high energy diet (3100 kcal ME/ kg) showed numerically higher body weight. The birds fed with 2800 kcal ME/ kg had significantly ($p \leq 0.05$) higher feed consumption when compared to diet containing 3100 kcal ME/ kg. The birds fed with diet containing 3100 kcal ME/ kg had significantly ($p \leq 0.05$) better FCR than 2800 kcal ME/ kg. In the low energy diet, FCR was negatively affected due to increased feed consumption of birds in this group to compensate their energy requirement [6].

4. Conclusion

The results obtained in this study suggest that the Gramasree cockerels might be fed with 20 percent CP and 3100 kcal ME/ kg for optimum growth and FCR.

5. Acknowledgment

The authors are grateful to the Dean College of Veterinary and Animal Sciences, Mannuthy, Thrissur, Kerala and Professor and Head, Department of Poultry Science, College of Veterinary and Animal Sciences, Mannuthy, Thrissur, Kerala for providing necessary facility for conducting this work.

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