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K Padma Priya

Final Year BSc (Hons)
Agriculture Student, Division of
Animal Husbandry, Faculty of
Agriculture, Annamalai
University, Thidalveli,
Tamil Nadu, India

S Nivetha

Final Year BSc (Hons)
Agriculture Student, Division of
Animal Husbandry, Faculty of
Agriculture, Annamalai
University, Thidalveli,
Tamil Nadu, India

N Parameshwari

Final Year BSc (Hons)
Agriculture Student, Division of
Animal Husbandry, Faculty of
Agriculture, Annamalai
University, Thidalveli,
Tamil Nadu, India

R John Christy

Associate Professor in Animal
Husbandry, Faculty of
Agriculture, Annamalai
University, Thidalveli,
Tamil Nadu, India

Corresponding Author

K Padma Priya

Final Year BSc (Hons)
Agriculture Student, Division of
Animal Husbandry, Faculty of
Agriculture, Annamalai
University, Thidalveli,
Tamil Nadu, India

Effect of unsalted fish meal on the weight gain performance of Japanese quails

K Padma Priya, S Nivetha, N Parameshwari and R John Christy

Abstract

The present study was designed to know the impact of unsalted fish meal as a protein source on the body weight gain of Japanese quails at various inclusion levels. A total of 48 numbers of 7 day old unsexed Japanese quail chicks from a single hatch was procured and randomly divided into three groups (i e) F₀ (control), F₁ (5% dried unsalted fish meal) and F₂ (10% dried unsalted fish meal) containing 16 number of chicks in each group. Japanese quails fed with 5% fishmeal attained an average body weight of 45g, 90g, 105g, 130g and 150g at 7, 14, 21, 28 and 35 days of age respectively. Paired t test value was found to be 3.1623 which was statistically significant at 0.05 significance level ($P < 0.05$). Further, Japanese quails fed with 10% fishmeal attained an average body weight of 50g, 100g, 125g, 140g and 170g at 7, 14, 21, 28 and 35 days of age respectively. Paired t test value was found to be 4.1295 which was statistically significant at 0.05 significance level ($P < 0.05$). The mean body weight attained was found to be more in the case of birds fed with unsalted fishmeal inclusion at 10% (F₂) compared to those fed with basal diet (F₀) and unsalted fishmeal inclusion at 5% (F₁). Thus it is concluded that the inclusion of dried unsalted fish meal in the basal diet can be used effectively and economically as an alternative protein source in commercial Japanese quail feed to increase body weight.

Keywords: Japanese quail, fish meal, alternate protein source

1. Introduction

Poultry industry is an important source of animal protein in both developed as well as developing countries. Global demand for animal-source food is accelerating rapidly due to population growth and economic development, particularly in developing countries. This increase in population growth estimated to be 8.1 billion in 2030 and 9 billion in 2050 will lead to the animal protein requirements and demands increasing. Poultry meat contributes approximately 370 g/kg to the total animal protein supply (Godfray *et al.*, 2010) [3]. The Japanese quail (*Coturnix coturnix japonica*) is native to Europe, northern Africa, and Asia. The raising of Japanese quail has been characterized as economically sustainable and highly productive (Vali, 2008), as this quail has a rapid growth cycle (3 to 4 generations per year) and is resistant to diseases (Cardozo-Jiménez, 2008) [1].

Growth in an animal or bird is a whole of complex physiological and morphological processes from hatching to maturity which is defined as the increases in the weight and volume measurements of the organs or body for a given time (Topal & Bölükbaşı, 2008) [8]. The FAO (FAO, 2014) [2] establishes that feed (animal/poultry feed) is "all simple or compound material, whether processed, semi-processed or unprocessed, used directly in feeding animals intended for human consumption".

However, the progress made so far in the Poultry sector in currently being undetermined by escalating cost of their feeds, increasing competitive demand for them and animals, and scarcity of the conventional protein source. Therefore to reduce the feed cost, which accounts for 75 to 80% of the total cost of production, efforts are being geared towards evaluating alternative, good quality renewable protein source that can replace and substitute scarce, expensive and elusive conventional protein sources used in poultry nutrition.

One of the most effective methods is the use of dietary strategies to improve the quality and weight gain in poultry. However, the major challenge in the long-term sustainability of quail production remains the cost of dietary protein and the supply of essential amino acids (Wickramasuriya *et al.*, 2015, Rezaei pour *et al.*, 2016) [9, 6]. To overcome these challenges, some alternative protein sources like fish meal has been tested to identify the possibility of incorporation in poultry ration. India is the largest producer of fish in the world, contributing 5.68% of the global production, fish processing for human consumption yields around 40% of

edible meat while remnant 60% is fishery by product composed by bones, skin, head, viscera, meat scraps and scales. Fish meal is an excellent source of protein for poultry. It has high levels of essential amino acids such as methionine and lysine, and it also has a good balance of unsaturated fatty acids, certain minerals (available phosphorus), and vitamins (A, D and B-complex) (Tidwell & Allan, 2001) [7].

Japanese quail (*Coturnix japonica*) is a diversified poultry species reared for commercial egg and meat production. It is blessed with unique characteristics of tone maintenance cost, easy handling, fast growth, early sexual maturity, less space requirement and being robust to many of the avian diseases, high rate of egg production short generation interval and valuable task and dietary properties of quail meat.

Keeping the above facts in the mind, the present study was designed to know the impact of unsalted fish meal as protein source on the body weight gain of Japanese quails at various inclusion levels.

2. Materials and Methods

The present study was conducted in the quail shed, Department of Animal Husbandry, Faculty of Agriculture, Annamalai University Cuddalore, Tamilnadu in the months of February and March 2022. The poultry shed and the equipments like feeders, drinkers were cleaned and disinfected before the arrival of chicks. The quail chicks were kept in separate pen throughout the experimental period from 7 to 35 days of age, following standard and uniform managemental procedures. Feed and water were provided ad libitum during the experimental period.

2.1. Preparation of unsalted fish meal

Wash the fish (1kg) with fresh water, split open the fish and remove the gills and internal organs to prevent contamination. Wash the fish again thoroughly. Dry the fish under direct sunlight for two to three days. After drying coarse grind the fish to make it as a powder.

2.2. Design of experiment

For the experimental trial, 48 seven days old chicks having similar body weight from a single hatch were procured from the quail farm in Vadalur. The chicks were maintained following the management practices under deep litter system using paddy husk as the litter material. The chicks were randomly divided into three groups viz, F0, F1 and F2 containing 16 chicks in each group in separate pen.

F0-Basal diet (Commercial Chicken Starter Mash)

F1-Inclusion of 5% dried unsalted fish meal with the basal diet

F2-Inclusion of 10% dried unsalted fish meal with the basal diet

The birds were fed twice daily at 7:00 AM in the morning and 6:00 PM in the evening, during the experimental period of 7-35 days of age. Body weights were recorded at weekly intervals for a period of four weeks. Paired t test was used to test the significance of the inclusion of unsalted fish meal on the body weight gain.

3. Results and Discussion

Actual mean weight gain recorded in different days with basal feed, unsalted fishmeal inclusion rate at 5% and unsalted fishmeal inclusion rate at 10% were presented in the Table-1

and Table-2 respectively. Japanese quails fed with 5% fishmeal attained an average body weight of 45g, 90g, 105g, 130g and 150g at 7, 14, 21, 28 and 35 days of age respectively. Paired t test value was found to be 3.1623 (Table-1) which was statistically significant at 0.05 significance level ($P < 0.05$). The analysis indicated that inclusion of unsalted fishmeal at 5% in the Japanese quails feed resulted in a significant weight gain compared with the quails that were fed only with a basal diet.

Japanese quails fed with 10% fishmeal attained an average body weight of 50g, 100g, 125g, 140g and 170g at 7, 14, 21, 28 and 35 days of age respectively. Paired t test value was found to be 4.1295 (Table-2) which was statistically significant at 0.05 significance level ($P < 0.05$). The analysis indicated that inclusion of unsalted fishmeal at 10% in the Japanese quails feed also resulted in a significant weight gain compared with the quails that were fed only with a basal diet. The mean body attained was found to be more in the case of birds fed with unsalted fishmeal inclusion at 10% (F2) compared to those fed with basal diet (F0) and unsalted fishmeal inclusion at 5% (F1). As the cost of unsalted fish meal in the coastal area was negligible, this study found that inclusion of unsalted fishmeal at 10% level resulted in a significant weight gain in the Japanese quails. The results obtained from this study concurred with various similar studies conducted various parts of the world (Zhou *et al.*, 2017, Nethee *et al.*, 2020, Mdhluvu *et al.*, 2021 and Nyuliwe *et al.*, 2022) [10, 4, 5]

Table 1: Weight recorded in grams at various intervals during the experiment

Day	Control with basal feed	Unsalted fishmeal inclusion at 5%
7	45	45
14	85	90
21	100	105
28	125	130
35	140	150
Mean	99	104
Standard Deviation	36.98	40.22
t	3.1623*	

Table 2: Weight recorded in grams at various intervals during the experiment

Day	Control with basal feed	Unsalted fishmeal inclusion at 10%
7	45	50
14	85	100
21	100	125
28	125	140
35	140	170
Mean	99	117
Standard Deviation	36.98	45.22
t	4.1295*	
Standard Error	4.359	

*Significant at 5%

4. Conclusion

Actual mean weight gain recorded in different days with basal feed, unsalted fishmeal inclusion rate at 5% and unsalted fishmeal inclusion rate at 10% indicated that the mean body attained was found to be more in the case of birds fed with unsalted fishmeal inclusion at 10% (F2) compared to those fed with basal diet (F0) and unsalted fishmeal inclusion at 5% (F1). As the cost of unsalted fish meal in the coastal area

was negligible, this study found that inclusion of unsalted fishmeal at 10% level resulted in a significant weight gain in the Japanese quails. Thus it is concluded that the inclusion of dried unsalted fish meal in the basal diet can be used effectively and economically as an alternative protein source in commercial Japanese quail feed to increase body weight.

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