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Effect of dietary energy and lysine levels on cost of production and profit of meat production in "TANUVAS Namakkal gold Japanese quails"

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Abstract

Two biological trials were conducted to determine the energy and lysine requirements of "TANUVAS Namakkal gold Japanese quail" for production performance. The economic impact of different levels energy and lysine during the chick (0-2 weeks) and grower (3-5 weeks) phases was assessed using seven hundred and twenty straight-run, day-old chicks randomly grouped in nine treatments with four replicates of twenty chicks each. Three levels of energy (2800, 2900 and 3000 kcal/kg) and three levels of lysine (1.2, 1.3 and 1.4%) were tested for chick and grower phase of the first experiment. The net profit per bird (Rs. 8.49) was high in group T_1 (low energy and low lysine) and the net profit per kg live weight (Rs. 48.57) was high in T_2 (2900 kcal/kg and 1.2%). For the second experiment an energy level of 2700, 2800 and 2900 kcal/kg was fixed for chick and grower mash, lysine level of 1.2, 1.3 and 1.4% was fixed for chick phase and 1.1, 1.2 and 1.3% for grower phase and the crude protein level was fixed as 20.3 and 19.4 per cent for chick and grower mash respectively for the second trial. The net profit per bird (Rs. 7.18) was high in group T_6 and the net profit per kg live weight (Rs. 37.62) was high in T_6 (2900 kcal/kg and 1.3% lysine during chick phase and 1.2% lysine during the grower phase).

Key Words: Economical efficiency, energy, lysine, net profit, production performance

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Over the recent decades the population of Japanese quail has been replaced by new varieties developed by genetic selection for better body weight and superior egg production performance (Hussain *et al.*, 2013). One such evolution is the "TANUVAS Namakkal gold Japanese quail" which is superior compared to both the parent lines and is used for commercial egg production purpose.

Energy-protein ratio and the ratio of energy to other nutrients are important in the formulation of diets. In recent days, importance is given for fixing the best ratio of lysine to other amino acids rather than the crude protein content of the diet otherwise called as ideal protein concept. Excess protein increases the oxidation of amino acids as source of energy and nitrogen excretion leading to environment pollution; whereas the deficiency increases the catabolism of body protein and fat (Filho *et al*., 2012). Hence, the present study was carried out to evaluate the production performance and its impact on economic efficiency fed with different dietary levels of metabolizable energy and lysine in "TANUVAS Namakkal gold Japanese quail".

Materials and Methods

Two experiments were conducted in "TANUVAS Namakkal gold Japanese quail" from day-old to 5 weeks of age. Both the experiments were conducted using seven hundred and twenty each, straight-run, day-old quail chicks. They were weighed and randomly assigned into nine treatments with four replicates of twenty chicks each. Nine diets were formulated with three levels of energy and three levels of lysine in a 3 x 3 factorial design for both the experiments.

Three levels of dietary energy (2800, 2900 and 3000 Kcal/kg) and three levels of lysine (1.2, 1.3 and 1.4 per cent) during chick cum grower phase (0-5 weeks) were used for the experiment -I. Based on the best results of the first experiment the energy and lysine levels were fixed for the second experiment. For experiment -II, isonitrogenous diet was formulated with crude protein level of 20.3% in chick (0-2 weeks) and 19.4% in grower stage (3-5 weeks) with three levels of dietary energy (2700, 2800 and 2900 Kcal/kg) and three levels of lysine (1.2, 1.3 and 1.4 per cent) during chick (0-2 weeks) phase and 2700, 2800 and 2900 kcal/kg and 1.1, 1.2 and 1.3% for the grower phase. The birds were reared in cages under standard and uniform management conditions throughout the experimental period. The quail chicks were fed with weighed quantity of experimental diets and they had free access to wholesome water.

Data on individual bird weight and total feed consumption in each replicate were recorded every week and mortality was recorded at the occurrence. The economics of feeding diets containing different levels of energy and lysine under cage system for chick cum grower (0-5 weeks) stage for both experiments was worked out using the prevailing feed cost and sale price of live bird and meat of Japanese quails.

Results and Discussion

The cost effectiveness of "TANUVAS Namakkal gold Japanese quail" from 1 to 5 weeks of age (chick cum grower) as influenced by different levels of energy and lysine in both the experiments are shown in Table 1 and 2.

The total feed cost per bird (Rs.11.87) and the cost of production per bird (Rs.17.87) was highest in the group T_8 (2900 kcal/kg and 1.4%) and the lowest total feed cost per bird (Rs.10.51) and the cost of production per bird (Rs.16.51) was observed in T_1 (2800 kcal/kg and 1.2%).

The net profit per bird (Rs. 8.49) was high in group T_1 and the net profit per kg live weight (Rs. 48.57) was high in T_2 (2900 kcal/kg and 1.2%). The net profit per bird (Rs.7.13) was lowest in group T_8 and the net profit per kg live weight (Rs.39.28) was lowest in T_7 (2800 kcal/kg and 1.4%).

Alagawany *et al.* (2014) reported that economic efficiency was higher in low protein (20%) and low lysine (1.05%) groups but not significant between the groups in Japanese quail which is similar to present results. In contrast Mahmood *et al.,* (2014) reported that

Table 1. Cost effectiveness of TANUVAS Namakkal gold Japanese quail from 1 to 5 weeks of age (chick cum grower) as influenced by different levels of energy and lysine (Experiment–I)

Treatment groups	Body weight (kg)	Total feed consumed (kg)		Cost of feed per kg (Rs.)		Total feed cost per bird (Rs.)	Cost of production per bird (Rs.)	Cost of production per kg live weight (Rs.)	Total income per bird (Rs.)	Net profit per bird (Rs.)	Net profit per kg live weight (Rs.)
		Chick	Grower	Chick	Grower						
T_1 (2800, 1.2)	0.188	0.073	0.404	23.43	21.77	10.51	16.51	88.02	25.00	8.49	45.30
T_2 (2900, 1.2)	0.173	0.071	0.396	23.85	22.48	10.60	16.60	96.05	25.00	8.40	48.57
T_3 (3000, 1.2)	0.168	0.066	0.400	24.28	23.22	10.90	16.90	100.78	25.00	8.10	48.31
T_4 (2800, 1.3)	0.182	0.070	0.398	23.85	22.54	10.63	16.63	91.32	25.00	8.37	45.99
T_5 (2900, 1.3)	0.177	0.070	0.388	24.28	23.16	10.67	16.67	94.21	25.00	8.33	47.04
T_6 (3000, 1.3)	0.168	0.069	0.390	24.70	23.89	11.04	17.04	101.71	25.00	7.96	47.54
T_7 (2800, 1.4)	0.185	0.072	0.408	24.29	24.50	11.74	17.74	95.93	25.00	7.26	39.28
T_8 (2900, 1.4)	0.170	0.073	0.401	24.76	25.08	11.87	17.87	105.03	25.00	7.13	41.88
T_9 (3000, 1.4)	0.166	0.069	0.392	25.32	25.64	11.79	17.79	107.37	25.00	7.21	43.54

Chick cost : Rs.5/- chick
Miscellaneous cost : Rs.1/- bird

increasing energy (3000 kcal/kg) level in the diet had enhanced the production efficiency with minimum cost.

The net profit per bird and net profit per kg live weight in low and medium energy (2800 and 2900 kcal/kg) and low lysine (1.2%) groups may be due to high growth rate, better feed efficiency and less feed cost.

The results of this experiment recommend low energy and lysine (2800 kcal/kg and 1.2 %) for best economic efficiency during the chick cum grower phase.

In the second experiment, the total feed cost per bird (Rs.13.31) and the cost of production per bird (Rs.19.43) was highest in the group T_4 (2700 kcal/kg and 1.3% lysine during chick phase 1.2% lysine during the grower phase) and the low total feed cost per bird (Rs.11.82) and the cost of production per bird (Rs.17.82) was low in T_6 (2900 kcal/kg and 1.3% lysine during chick phase 1.2% lysine during the grower phase).

The net profit per bird (Rs. 7.18) and the net profit per kg live weight (Rs. 37.62) was high in T_6 (2900 kcal/kg and 1.3% lysine during chick phase and 1.2% lysine during the grower phase). The net profit per bird (Rs.5.57) was low in group T_4 and the net profit per kg live weight (Rs.26.20) was low in T_1 (2700 kcal/kg and 1.2% lysine during chick phase and 1.1% lysine during the grower phase).

Mahmood *et al.,* (2014) reported that increasing energy (3000 kcal/kg) level in the diet enhanced the production efficiency with minimum cost which is in accordance to this experiment. On the contrary, Alagawany *et al.* (2014) reported that economic efficiency was higher in low protein and low (1.05 %) lysine groups in Japanese quails.

The net profit per bird and net profit per kg live weight in low and medium energy (2800 and 2900 kcal/kg) and low lysine (1.2%) groups may be due to high growth rate, better feed efficiency and less feed cost.

The results of this trial recommend low energy and lysine (2800 kcal/kg and 1.2%) for best economic efficiency during the chick cum grower phase.

Table 2. Cost effectiveness of TANUVAS Namakkal gold Japanese quail from 1 to 5 weeks of age (chick cum grower) as influenced by different levels of energy and lysine (Experiment–II)

Treatment groups	Body weight (kg)	Total feed consumed (kg)		Cost of feed per kg (Rs.)		Total feed cost per bird (Rs.)	Cost of production per bird (Rs.)	Cost of production per kg live weight (Rs.)	Total income per bird (Rs.)	Net profit per bird (Rs.)	Net profit per kg live weight (Rs.)
		Chick	Grower	Chick	Grower						
T_1 (2700, 1.1)	0.217	0.125	0.540	20.44	19.92	13.31	19.31	88.91	25.00	5.69	26.20
T_2 (2800, 1.1)	0.211	0.113	0.500	20.76	20.28	12.50	18.50	87.79	25.00	6.50	30.84
T_3 (2900, 1.1)	0.195	0.107	0.486	21.12	20.61	12.29	18.29	93.83	25.00	6.71	34.42
T_4 (2700, 1.2)	0.220	0.108	0.553	21.08	20.17	13.43	19.43	88.32	25.00	5.57	25.31
T_5 (2800, 1.2)	0.203	0.096	0.502	21.56	20.55	12.39	18.39	90.40	25.00	6.61	32.50
T_6 (2900, 1.2)	0.191	0.084	0.472	22.43	21.04	11.82	17.82	93.35	25.00	7.18	37.62
T_7 (2700, 1.3)	0.197	0.075	0.489	23.20	21.98	12.47	18.47	93.88	25.00	6.53	33.16
T_8 (2800, 1.3)	0.202	0.075	0.494	23.68	22.69	13.00	19.00	93.85	25.00	6.00	29.66
T_9 (2900, 1.3)	0.199	0.074	0.469	24.40	23.21	12.71	18.71	93.80	25.00	6.29	31.56

Chick cost : Rs.5/ chick
Miscellaneous cost : Rs.1/ bird

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