

Replacement of Fish Meal by Sesame Oil Cake on the Performance of Starcross Layer Reared on Pond

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Abstract: The study was conducted for a period of 6 months to observe the effect of replacing fish meal(FM) by sesame oil cake(SOC) on the performance of Starcross layer reared on pond. A total of 72 birds of twenty weeks of age were divided into three treatments having 3 replications in each. Diet for treatment A contains fish meal and sesame oil cake @12% with other conventional ingredients. Fish meal was replaced by SOC at the rate of 25 and 50% in the treatment B and C respectively. The results clearly indicated the comparative usefulness of SOC as replacer of FM when the cost per kg egg production was considered. All the treatments were found to be almost equally suitable for rearing of starcross layer. So, it may be suggested to replace FM by SOC up to a level of 50% depending upon the availability and price.

Key words: Fish meal, sesame oil cake, Starcross layer

Introduction

Raising layers on fish farming pond is a modern concept in integrated farming system aimed at optimum utilization of resources with maximum benefits. In poultry cum fish farming, the poultry not only produce eggs and meat but also the indigestible nutrients in their feces is recycled in ponds, producing additional protein in the form of fish.

Per day egg production in Bangladesh is 1.66 million against the requirement of 12.66 millions, resulting a deficiency of 87% (BARC, 1990). Egg type poultry production can play a vital role in solving this problem in a shortest possible time. Fishmeal is commonly used as a protein supplement in poultry diet. But, the cost of this ingredient is very high and is increasing day by day. Therefore, a strong economic incentive exists to find out alternative good protein source.

According to BBS report 1991, 23.52 thousand metric tons of sesame oil cake is produced annually in Bangladesh from 42 thousand metric tons of sesame seed. So, it is comparatively easily available and is highly cheaper than FM. Some scientists used vegetable protein in layer ration with some amino acids and observed better performance (Kapoor *et al.*, 1991; Tomova and Sudzhiiska, 1986). So, the present experiment was conducted to study the effect of replacement FM by sesame oil cake in layer ration on production and quality of eggs.

Materials and Methods

The study was conducted for a period of 6 months with a total of 72 twenty weeks aged Starcross birds, distributed into 3 treatments having 3 replications in each. Diet in treatment A contains 12% FM meal and 12% sesame oil cake. Fishmeal was replaced by sesame oil cake at the rate of 25 and 50 percent in treatment group B and C respectively. Feed and water were supplied as *ad libitum* basis. Composition of the experimental rations is given in Table 1.

Birds were reared in a bamboo made house, constructed about 60 cm above the water level on a pond. Each house was 3.0x2.25m in size with a height of 1.83m. The houses were constructed with fences made of bamboo. The side wall of the houses were made of bamboo splits up to a height of 0.6m above which wire net fence was provided for ventilation. Roof of the house was made by bamboo splits under which a polythene sheet was given. The floor of the house was made of bamboo splits, with a gap of 1.0 cm in between the splits to allow the feces to fall directly into the pond. Each big house was divided into three compartments by bamboo fence to maintain three replications.

Floor space, lighting, medication, vaccination and other management practices were similar for all groups throughout the period. The feed ingredients used in formulating the

Table 1: Composition of the Experimental rations (g/Kg)

Ingredients	Treatment Groups		
	A	B	C
Wheat	500.00	500.00	500.00
Rice polish	170.00	170.00	170.00
Sesame oil cake	120.00	150.00	180.00
Fish meal	120.00	90.00	60.00
Oyster shell	80.00	80.00	80.00
Common salt	10.00	10.00	10.00
Embavit-L	2.50	2.50	2.50
Cost /Kg diet	8.31	7.22	6.13
Chemical Composition (g/Kg DM)			
CP	176.10	172.90	169.20
CF	82.20	76.90	82.20
EE	80.20	80.50	80.20
ME(MJ/KgDM)	10.85	10.77	10.69

Composition of Embavit L (Per 2.5g): Vit. A, 1200 IU, D³ 2500 IU, B₂ 50mg, B₃ 4.0mg, Nicotinic acid 30.0mg, Pantothenic acid 10.0mg, Vit.B₁₂ 0.01mg, Folic acid 0.5mg, Cobalt 0.3mg, Copper 16.0mg, Iron 24.0mg, Iodine 0.6mg, Manganese 48.0mg, Zinc 50.0mg, Selenium 0.12mg, DL-Methionine 50mg, Choline Chloride 250.0mg, B.H.T. 250.0mg

experimental diets were analyzed for proximate components as per AOAC (1984). Data recorded for feed consumption, egg production, egg weight, feed cost per egg yield were subjected to analysis of variance in a completely randomized design as per Steel and Torrie, 1980.

Results and Discussion

The highest rate of egg production (egg/month) was observed in 3rd month of production in treatment A(20.7) and B(17.3) but in treatment C(14.9) highest rate of egg production was obtained in 6th month of production(Table 2). Average egg production was highest ($p > 0.01$) in treatment A (16.9) followed by treatment B(15.2) and C (14.7). The egg production decreased gradually with the replacement of FM by sesame oil cake. Similar result obtained by Kapoor *et al.* (1991) and Sevçican *et al.* (1983) in their experiment where FM protein was replaced by vegetable protein.

The highest egg weight was observed ($p < 0.01$) in treatment A(57.1g) but egg weight of B(55.9g) and C(55.5g) were almost similar. This finding was supported by Sevçican *et al.* (1983). They observed that decreasing FM in the ration influence to decrease the egg weight. The present finding is also supported by Tomova *et al.* (1983) and Velasco *et al.* (1985), they reported that fish meal in the ration had no significant effect on egg weight. The egg weight increased

Islam *et al.*: Fish meal, sesame oil cake, starcross layer

Table 2: Production and quality of eggs

Treatment groups	Months						Average
	1st	2nd	3rd	4th	5th	6th	
			Egg production in number				
A	10.8	18.8	20.7	17.1	16.8	17.3	16.9
B	8.0	16.0	17.3	16.2	16.9	17.1	15.2
C	8.1	16.5	16.0	14.9	15.8	17.0	14.7
			Egg production in percent				
A	36.1	62.5	68.9	56.1	55.9	57.3	56.13
B	27.0	53.2	57.8	53.9	56.3	57.1	50.88
C	27.1	55.1	53.5	49.7	52.8	56.7	49.15
			Egg weight in gram				
A	39.7	52.9	56.5	62.8	65.9	64.7	57.10
B	40.6	51.9	55.6	61.1	62.9	63.0	55.90
C	39.4	50.8	55.1	60.4	63.5	64.1	55.50

Data showed non-significant differences among the treatments ($p > 0.05$)

Table 3: Feed intake(g/b/d), cost(kg eggs) and conversion efficiency(feed/eggmass)

Treatment	Months						Average
	1st	2nd	3rd	4th	5th	6th	
			Feed intake				
A	115.0	118.0	119.0	120.0	120.0	119.0	118.55
B	115.0	119.0	120.0	120.0	121.0	120.0	119.17
C	115.0	120.0	119.0	120.0	120.0	119.0	118.76
			Feed conversion ratio				
A	7.99	3.57	3.06	3.36	3.26	3.19	4.07
B	10.68	4.31	3.73	3.63	3.40	3.35	4.85
C	10.78	4.24	4.04	3.99	3.59	3.29	4.99
			Feed cost				
A	66.40	29.67	25.43	27.92	27.09	26.50	33.82
B	77.10	31.12	26.93	26.21	24.55	24.18	35.01
C	66.08	26.17	24.76	24.45	22.01	20.17	30.60

Data showed non-significant differences among the treatments ($p > 0.05$)

gradually as the advancement of age of the hens (Table 2).

The highest amount of feed was consumed by layers of treatment group B(119.17g/d) followed by 118.55 and 118.76 for C and A respectively ($p < 0.01$). Daily feed consumption increased gradually up to the fifth month of production but slightly decreased in sixth month (Table 3).

The feed conversion ratio gradually decreased with the advancement of production period, i.e. feed conversion ratio at sixth month was the best than the other periods. This variation might be due to adjustment with the rations by the experimental birds. On the other hand, feed conversion ratio were gradually increase with increasing level of sesame oil cake i.e. feed conversion of treatment A was better than treatment C. This result is in agreement with the findings of Ready and Eshwaraiah (1991) and Vogt *et al.* (1964) but differ with the results of Ergul and Vogt (1983). This discrepancy might be due to animal protein factor or essential amino acid present in the animal protein.

It is revealed from the Table 3 that the cost per kg egg production was decreased with the advancement of production period. Although the total feed consumed by the birds of the treatment group C was higher than the birds of the treatment group A. The feed cost per kg egg production for the treatment group C was lower than the treatment group A and B at different stages of production period. This result indicated that the replacement of FM by sesame oil cake in laying hen ration might be economical. The results of this study clearly indicated the comparative usefulness of replacing FM by sesame oil cake when the cost per Kg egg production was considered. All the treatments were found to be almost equally suitable for rearing of Starcross layers. So, FM may be

replaced by sesame oil cake up to a level of 50% in layer ration without any adverse effects on production and quality of eggs.

References

- A.O.A.C., 1984. Official Method of Analysis, (15th ed.). Association of Official Analytical Chemists, Washington, D.C.
- B.A.R.C(Bangladesh Agricultural Research Council). 1990. Bhacshyater Khady Amonograph, published in bengoli for world food day, 1990, P:15.
- B.B.S(Bangladesh Bureau of statistics), 1991. Statistical yearbook of Bangladesh, Ministry of Planning, Govt. of the Peoples Republic of Bangladesh, Dhaka, Bangladesh.
- Ergul, M and H. Vogt, 1983. Replacement of fish meal bacterial protein in broiler feeds with large amounts of cotton seed and sunflower seed meals., Ege Universitesi Ziraat Fakiltesi Dergisi, 20: 29-42.
- Kapoor, V., V.P. Sharma, K. Pradhan, R.S. Thakur and V.P. Saxena, 1991. Effect of dietary protein levels and some supplemental amino acids on the performance of laying hens. Indian J. Anim. Nutr., 8: 249-252.
- Sevgican, F., O. Sori and T. Capci, 1983. Molasses yeast in place of fish meal in feeds for laying hens. Ege Universitesi Zirrt Fakiltesi Dergisi, 20: 19-24
- Tomova, D. and S. Sudzhiiska, 1986. Substitution of fish meal in mixed feeds for laying hens with fodder yeasts, Zhivotnov di Navki, 23: 31-34.
- Reddy, V.R. and Eshwaraiah, 1991. Performance of broilers on vegetable sources of protein. Indian J. Anim. Nutr., 8:301-304.
- Steel, R.G.D and J.H. Torrie, 1980. Principles and procedures of Statistics. McGraw Hill Book Company Inc., New York.
- Vogt, H and K. Stute, 1964. Effect of different amounts of fish meal in poultry fattening feed with reference to protein and energy requirement. Arch. Geflugeik, 28:426-436.