



Research Article

SESAME OIL CAKE (SESAMUM INDICUM) ON THE PERFORMANCE OF BROILER STARTER

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ABSTRACT

An experiment was conducted to study the effect of feeding sesame oil cake by replacing protein concentrate mixture on the performance of broiler starter (0-3 weeks). Day-old chicks (n = 240), randomly allotted to eight treatment groups in duplicate of fifteen chicks each, were used in the study of 3 weeks. The sesame oil cake was included at different levels viz., 0(T1), 5(T2), 7.5(T3), 10(T4), 12.5(T5), 15(T6), 17.5(T7) and 20% (T8) in broiler starter rations by replacing the protein concentrate mixture (PC) containing soyabean meal (30%), groundnut deoiled cake (25%), rice polish (41%) and rice bran oil (4%) on part by part basis in an isocaloric and isonitrogenous broiler starter (0-3 weeks) mash. At the end of 3 weeks, the mean weight gain and feed efficiency were 434, 433, 455, 479, 485, 498, 488, and 451g; and 1.44, 1.45, 1.45, 1.45, 1.42, 1.47, 1.46, and 1.53, respectively. There was a linear increase in weight gain as the level of sesame oil cake increased from 0-15% and the weight gain (g) was significantly ($P < 0.01$) higher in 15% sesame oil cake inclusion level (498 g) compared to control group (434 g). The overall feed efficiency and protein efficiency ratio (PER) among the treatment groups were statistically similar. Therefore, it could be concluded that inclusion of sesame oil cake up to 15% level in broiler starter ration was found to be advantageous without affecting the weight gain, feed intake, feed efficiency and protein efficiency ratio.

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INTRODUCTION

Sesame is one of the oldest oil seed crops of the world. Its oil is chiefly used for cooking in South India. It is cultivated extensively in India, China, Burma and also in other parts of Asia, Africa and Latin America. The sesame seed contains about 50% oil and 20-25% protein (Vaughan, 1970). Normally the oil is used for edible purposes and also been utilized in soap, insecticide, paint and perfume manufacturing. The residue sesame oil cake which is produced to a level of 2,55,000 tonnes per annum in India (1997-98) and about 25,000 tonnes in Tamil Nadu (Mehta, 2000) is mostly used for feeding cattle. Lack of much research work on its use in broiler ration in India has impaired its use commercially by broiler farmers. Hence, in the present study an attempt was made to study the effect of feeding sesame oil cake by replacing protein concentrate mixture on the performance of broiler starter (0-3 weeks).

MATERIALS AND METHODS

The sesame oil cake sample for conducting biological trial was procured in bulk locally.

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The biological experiment in broiler starter (0-3 weeks) was carried out in the Department of Animal Nutrition, Veterinary College and Research Institute, Namakkal, following the standard procedures to assess the feeding value of sesame oil cake.

Effect of feeding sesame oil cake on broiler starter (0-3 weeks)

The dietary treatment groups contained 0, 5, 7.5, 10, 12.5, 15, 17.5 and 20% levels of inclusion of sesame oil cake replacing the protein concentrate mixture (PC) containing soyabean meal (30%), groundnut deoiled cake (25%), rice polish (41%) and rice bran oil (4%) (Table 1) on part by part basis in an isocaloric and isonitrogenous starter (0-3 weeks) mash. The protein concentrate mixture and the experimental diets were analyzed for proximate constituents, calcium, phosphorus and sodium chloride contents (AOAC, 1990). The ingredient and chemical composition of the starter diets used in the trial are given in Table 2.

Experimental design and management of birds

Two hundred and forty day-old commercial (Vencobb) broiler chicks were weighed, wing banded individually and randomly allotted to eight treatment groups in duplicate of fifteen chicks each.

Table 1. Ingredient and nutrient compositions (% DM) of protein concentrate

Ingredient	Composition
Rice polish	41.00
Deoiled groundnut cake	25.00
Soyabean meal	30.00
Rice bran oil	4.00
Total	100.00
Nutrient composition	
Dry matter	92.31
Crude protein	30.08
Crude fibre	10.13
Ether extract	11.48
Total ash	9.42
Nitrogen free extract	38.89
Acid insoluble ash	3.36
Calcium	0.86
Total phosphorus	0.81
Sodium chloride	0.10
Available phosphorus*	0.15
Methionine*	0.39
Lysine*	1.36
Metabolizable energy* (kcal/kg)	2848.00

*Calculated values

Table 2. Ingredient and nutrient compositions (% DM) of broiler starter mash (0-3 weeks)

Ingredients	Per cent level of sesame oil cake inclusion in the ration							
	0.0	5.0	7.5	10.0	12.5	15.0	17.5	20.0
Maize	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
Soyabean meal		24.00	24.00	24.00	24.00	24.00	24.00	24.00
Deoiled rice bran	24.00	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Protein concentrate	2.50	15.00	12.50	10.00	7.50	5.00	2.50	0.00
Sesame oil cake	20.00	5.00	7.50	10.00	12.50	15.00	17.50	20.00
Dicalcium phosphate	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Calcite	2.00	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Total	1.50	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Vitamin AB ₂ D ₃ K (g) (1)	100.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Vitamin B complex (g)(2)	10.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
Coccidiostat (g) (3)	25.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
L.Lysine hydrochloride (99%) (g)	50.00	180.00	190.00	200.00	210.00	220.00	240.00	250.00
DL.Methionine (99%) (g)	160.00		210.00	190.00	170.00	150.00	130.00	110.00
Choline chloride(50%)(g)	260.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Trace minerals (g) (4)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Sodium chloride (g)	100.00	400.00	400.00	400.00	400.00	400.00	400.00	400.00
<i>Nutrient composition</i>		400.00						
Dry matter		90.50	90.42	90.38	90.26	90.63	90.68	90.72
Crude protein	90.18	21.87	22.59	21.90	22.93	23.09	22.25	22.82
	22.74							

Continue.....

Ingredients	Per cent level of sesame oil cake inclusion in the ration							
	0.0	5.0	7.5	10.0	12.5	15.0	17.5	20.0
Crude fibre	5.54	5.67	5.71	5.60	5.77	5.27	5.48	5.06
		3.66	4.21	3.74	3.94	5.29	5.47	2.36
Ether extract	5.78	7.65	7.98	8.24	7.54	7.98	8.57	8.62
Total ash		61.15	59.51	60.52	59.82	58.37	58.23	61.14
Nitrogen free extract	7.27	1.33	1.39	1.28	1.17	1.06	1.09	10.03
Acid insoluble ash	58.67	1.31	1.18	1.29	1.31	1.51	1.62	1.84
Calcium	1.47	0.62	0.67	0.71	0.68	0.66	0.67	0.71
Total phosphorus	1.31	0.27	0.28	0.34	0.40	0.46	0.46	0.50
Sodium chloride	0.59	0.47	0.47	0.48	0.48	0.49	0.49	0.50
Available phosphorus*	0.21	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Methionine*	0.46							
Lysine*		1.20	1.20	1.20	1.20	1.20	1.20	1.20
Metabolizable energy* (kcal/kg)	0.50	2835.00	2836.25	2837.50	2838.75	2840.00	2841.25	2842.50
	1.20							
	2832.50							

¹Vitamin AB₂D₃K supplied (per kg diet): Vitamin A, 8250 IU; Vitamin B₂, 5 mg; Vitamin D₃, 1200 IU; Vitamin K, 1mg.²Vitamin B complex supplied (per kg diet): thiamine, 1 mg; pyridoxine, 2 mg; cyanocobalamine, 15 mcg; Vitamin E, 10 mg; niacin, 15 mg; pantothenate, 10 mg; folic acid, 1 mg.³Coccidiostat contained: 3-5, dinitro-O-toluamide-25%, ethopabate-1.6%.⁴Trace mineral supplied (mg/kg diet): manganese, 180; zinc, 140; iron, 40; iodine, 4; copper, 30; cobalt, 2.

*Calculated values.

Table 3. Effect of inclusion of sesame oil cake in broiler starter (0-3 weeks)

Level of sesame oil cake	Weight gain (g)	Feed intake (g)	Feed efficiency	Protein intake (g)	P.E.R
Control diet (T ₁)	434 ^a ± 47.92	624 ^a ± 25.26	1.44 ± 0.01	128 ^{ab} ± 5.18	3.39 ± 0.13
5% sesame oil cake (T ₂)	433 ^a ± 57.29	626 ^a ± 26.59	1.45 ± 0.04	124 ^a ± 5.26	3.49 ± 0.15
7.5% sesame oil cake (T ₃)	455 ^{ab} ± 53.96	661 ^{ab} ± 3.44	1.45 ± 0.00	135 ^{abc} ± 0.70	3.37 ± 0.01
10% sesame oil cake (T ₄)	479 ^{bc} ± 65.99	693 ^{bc} ± 3.19	1.45 ± 0.04	137 ^{bc} ± 0.63	3.50 ± 0.01
12.5% sesame oil cake (T ₅)	485 ^{bc} ± 58.23	690 ^{bc} ± 23.86	1.42 ± 0.04	143 ^{cd} ± 4.94	3.39 ± 0.12
15% sesame oil cake (T ₆)	498 ^c ± 61.11	731 ^c ± 3.58	1.47 ± 0.03	153 ^d ± 0.74	3.25 ± 0.01
17.5% sesame oil cake (T ₇)	488 ^{bc} ± 52.91	714 ^{bc} ± 21.50	1.46 ± 0.02	144 ^{cd} ± 4.33	3.39 ± 0.10
20% sesame oil cake (T ₈)	451 ^{ab} ± 62.44	689 ^{bc} ± 0.36	1.53 ± 0.02	142 ^{cd} ± 0.07	3.18 ± 0.00

^{abcd} Means values with different superscript within a column differ significantly; ** (P<0.01).

All the chicks were reared in well prepared deep litter pens, following standard management practices uniformly for all the treatments. Throughout the experimental period, feed and water were provided *ad libitum*. Records of daily feed intake, weekly weight gain and feed efficiency were maintained throughout the experimental period.

Statistical analysis

The data collected in this experiment were analyzed statistically for the test of the significance as suggested by Snedecor and Cochran (1989).

RESULTS AND DISCUSSION

Effect of feeding sesame oil cake on broiler starter (0-3 weeks)

The sesame oil cake were included at different levels *viz.*, 0(T₁), 5(T₂), 7.5(T₃), 10(T₄), 12.5(T₅), 15(T₆), 17.5(T₇) and 20% (T₈) in broiler starter rations and performance of broiler starter were assessed in terms of weight gain, feed intake and feed efficiency during 0-3 weeks period and the results are presented in Table 3.

Weight gain

The mean body weight gain at the end of 3 weeks period was 434, 433, 455, 479, 485, 498, 488 and 451 g in T₁, T₂, T₃, T₄, T₅, T₆, T₇ and T₈ groups (Table 3), respectively. Significantly (P<0.01) higher weight gain was recorded in T₆ group which received 15% sesame oil cake as compared to T₁, T₂, T₃ and T₈ groups. As compared to the control group (T₁) the weight gain of other groups (T₆ and T₇) was found to be superior. Similar observation was recorded by Baghel and Netke (1987) in broilers fed 23.5% sesame meal and 28.2% soyabean extraction. Thus the improvement in weight gain in T₆ group could be the results of supplementary effect of sesame oil cake with the other two vegetable proteins (soyabean meal and groundnut deoiled cake). Similar increase in weight gain was recorded by Gohl (1981) in chick diet.

Feed consumption

The cumulative feed intake in broiler starter fed different level of sesame oil cake is furnished in Table 3. Significantly (P<0.01) higher feed intake was observed in T₆ group fed 15% sesame oil cake as compared to T₁, T₂, T₃ groups at the end of 3 weeks. Similar observation was recorded by Baghel and Netke (1987) in broilers fed different levels of sesame meal.

Feed efficiency and protein efficiency ratio (PER)

This study showed no significant variation in feed efficiency and protein efficiency ratio among various treatment groups during starter phase (Table 3). Similar observation was recorded by Dagher *et al.* (1967) in broilers fed sesame meal replacing 50% of soyabean meal.

Conclusion

Based on the present results it can be concluded that inclusion of sesame oil cake replacing protein concentrate mixture in broiler starter ration was found to be advantageous without affecting the weight gain, feed intake, feed efficiency and protein efficiency ratio up to 15% inclusion level.

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REFERENCES

- AOAC, 1990. *Official Methods of Analysis*, 15th ed. Association of Official Analytical Chemists, Washington, DC.
- Baghel, R.P.S. and Netke, S.P. 1987. Economic broiler ration based on vegetable proteins. *Indian Journal of Animal Nutrition*, 4: 24-27.
- Dagher, N.J., Ullah, M.F. and Rottensten, K. 1967. Lysine supplementation of sesame meal in broiler rations. *Tropical Agriculture*, 44: 235-242.
- Gohl, B. 1981. *Tropical Feeds*. Animal Production and Health Series No. 12. Food and Agricultural Organization of the United Nations, Rome, Italy.
- Mehta, B.V. 2000. *Sea Millennium Handbook 2000*, 7th ed. The Solvent Extractors Association of India, Mumbai.
- Snedecor, G.W. and Cochran, W.G. 1989. *Statistical Methods*, 8th ed. Iowa State University Press, Ames, Iowa, USA.
- Vaughan, J.G. 1970. *The Structure and Utilization of Oil Seeds*. Chapman and Hall Ltd., London, pp. 200-203.