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Review Article

FEEDING VALUE OF SESAME OIL CAKE FOR BROILERS

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Abstract: The broiler feed requirement for the present 600 million birds in India is estimated to be about 24 lakhs tonnes per annum and it consists of nearly 35% of oil cakes/meals as a source of protein. Among the commonly used oil cakes/meals in broiler ration soyabean meal predominates, followed by groundnut oil cake. At times the soyabean meal may also touch an uneconomical cost causing higher production cost of feed. On the other hand, the presence of aflatoxin in groundnut oil cake has impaired its use at higher inclusion levels. Hence literature on feeding value of sesame oil cake for broiler was reviewed.

Weight Gain, Feed Intake and Feed Efficiency

As early as 1944 Almquist and Grau (1944) reported the complementary effect of soyabean meal and sesame meal in the ratio of 2:1 was satisfactory for broilers. However, subsequent studies showed that a wider ratio of 1:3 was sufficient to support satisfactory growth of chicks (Cuca and Sunde, 1967).

Daghir *et al*. (1967) observed that the sesame meal can replace 50% of the soyabean meal in broiler rations supplemented with 2% fish meal without significant change in weight gain and feed efficiency. Daghir and Kevorkian (1970) stated that the high methionine content and deficiency of lysine in sesame oil cake paved way for its utilisation in broiler rations as a partial replacement to fish meal, and/or soyabean meal.

Gohl (1981) inferred that the sesame meal when combined with groundnut meal or mixed with an equal amount of cottonseed meal and adequately supplemented with blood meal results in a well balanced protein supplement that could be added up to 15% in the chick diet to maintain the production performance.

Baghel and Netke (1987) conducted an experiment to find most suitable combination of soyabean extraction and sesame cake in the diet of broilers. They included sesame meal at 13.7, 24.55, 25.64, 26.73 and 28.20% in the ration. They reported that the weight gain and feed efficiency in the combination of 23.5% soyabean meal and 28.2% sesame meal groups

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(857g and 0.457) was better than control (767.7 g and 0.411) group containing 45% soyabean meal alone. They concluded that the overall performance of broilers fed a combinations having 28.2% sesame meal and 23.5% soyabean extraction was most suitable.

Rajasekhara Reddy and Eshwariah (1989) conducted an experiment in broiler starters containing 12% fish meal by including soyabean and sesamum oil cake and replacing the fish meal at 25, 50, 75 and 100% levels. They observed that the weight gain (1247 g) and feed efficiency (2.49) of groups receiving diet with 75% fish meal replacement were comparable to the control diet (1222 g and 2.47). They concluded that the diet containing fish meal replaced at 25% level was significantly better ($P<0.05$) both for weight gain and feed efficiency (1338 g and 2.25) as compared to other diets.

Bell *et al*. (1990) evaluated the use of sesame meal as a partial replacement of soyabean meal in an isocaloric broiler diet. They concluded that the sesame meal may provide an acceptable alternative to soyabean meal up to a substitution level of 15%. Nagra (1990) concluded that the combination of groundnut meal + til cake + soyabean meal in the ratio of 1 + 1 + 2 in broiler rations gave a better weight gain (1165 g) compared to groundnut meal + til cake 1 + 1 ratio (1045 g) or groundnut meal alone (1026 g).

Ramasubba Reddy and Eswaraiah (1991) conducted an experiment in male broiler chicks with combination of vegetable and animal protein feedstuffs. The treatment groups were groundnut meal + fish meal, soyabean meal + fish meal, groundnut meal alone, soyabean meal alone and sesame meal + soyabean meal in equal proportion supplemented with L-lysine hydrochloride and/or DL-methionine for 6 weeks. The weight gain in soyabean meal alone group (1541 g) was appreciably better than other vegetable protein groups (1442 to 1458 g). Feed efficiency on diets containing vegetable protein sources (1.95 to 2.02) only was better than those containing fish meal (2.04 to 2.06).

Mamputu and Buhr (1995) replaced soyabean meal with sesame oil cake by including sesame meal at 0, 15, 30, 45 or 60% of the dietary crude protein. The performance of broiler chicks at the end of 3 weeks fed diet containing sesame meal at 15% dietary crude protein was not different from that of control chicks fed soyabean meal diet. Feed intake, body weight gain and feed conversion were consistently depressed with increased sesame meal substitution at 30, 45 or 60% of dietary crude protein.

In another experiment the same authors included sesame oil cake at 0, 38 or 76% of dietary crude protein and reported that the feed intake was not different from that of control chicks fed the soyabean meal diet and those fed the diet containing sesame meal at 38% of dietary

crude protein. However, body weight gain and feed conversions of chicks fed diets containing sesame meal at 38% (579 g and 1.6) or 76% (62 and 3.5) of dietary crude protein were significantly lower than those of control (703 g and 1.3) chicks fed the soyabean meal diet.

Kuldeep Singh and Thakur (2000) studied the effect of certain vegetable protein combination like sesame oil cake, mustard cake, guar meal roasted and sunflower seed meal on broiler performance. They reported that the body weight gain for different treatment groups were similar for both starter and finisher phases. The feed intake and feed efficiency in 15% sesame oil cake groups were almost similar to control group.

Majumder and Samanta (2001) conducted an experiment in broilers. The broiler starter diet contained 14% fish meal which was replaced by sesame cake protein at 50, 75, 87.5 and 100% levels with or without supplementation of enzyme combination. Synthetic lysine and methionine were incorporated at optimum levels. The body weight gain at the end of 6 weeks up to 50% replacement of fish meal (1375 g) was marginally lower than control (1440 g) but not statistically significant. Beyond 50% inclusion level there was a significant reduction in weight gain ($P<0.01$). Enzyme supplementation was found to improve the weight gain up to 75% replacement (1423 g). The authors inferred that the reduction in weight gain was attributed to improper utilization of plant proteins, absence of vitamin B_{12} and other essential factors.

Blood Parameters

The normal blood parameters in broilers are presented in Table 1.

Table 1: Blood parameters in broiler chicken

S. No.	Blood Parameters	Values	References
1.	Packed cell volume (%)	24 - 45	Banerjee (1998)
2.	Haemoglobin (g/dl)	7 – 13	Banerjee (1998)
3.	Total protein (g/dl)	4.62	Sturkie (1986)
	Albumin (g/dl)	1.81	Sturkie (1986)
	Globulins (g/dl)	2.80	Sturkie (1986)
4.	Total lipids (mg/dl)	650	Sturkie (1986)
5.	Total cholesterol (mg/dl)	183.8	Jerry Kaneko *et al*. (1997)
6.	HDL (mg/dl)	30.7	Razdan and Pettersson

			(1996)
7.	LDL (mg/dl)	44.3	Razdan and Pettersson (1996)
8.	Calcium (mg/dl)	9 – 24	Banerjee (1998)
9.	Phosphorus (mg/dl)	6.2 – 7.9	Banerjee (1998)

Slaughter Studies

Hasan and Khandaker (2000) studied the comparative effect of fish meal and other protein concentrates on the performance of broilers, which were fed with diets containing 10% sesame oil cake uniformly in all groups. The authors reported that the dressing percentage remained similar among the various treatment groups. Similarly Aziz *et al*. (2001) while replacing fish meal protein with soyabean meal and sesame oil cake, inferred that the dressing percentage was similar in all the treatment groups. Sturkie (1986) reported that generally feathers constitute 5-10 % of the body weight and serine, glycine are the most abundant amino acid in feathers whereas methionine, histidine, lysine and tryptophan occur at a lower level.

Tibial Ash, Calcium and Phosphorus

Lima *et al*. (1997) recorded a mean total ash content of 39.7% in the bones of broilers. McDonald *et al*. (1995) reported that bones contain approximately 46% ash and the bone ash contained approximately 36% calcium and 17% phosphorus.

Proximate Composition of Breast Meat

Macrae *et al*., (1993) reported that the raw breast meat without skin contained 74.76% moisture, 23.09% protein, 1.24% total lipids and 1.02% total ash.

Livability

Rajasekhara Reddy and Eshwariah (1989) observed no mortality in broiler chicks fed sesame cake and soyabean meal replacing fish meal at 25 and 50% level. Similarly Mamputu and Buhr (1995) also reported no mortality in laying hens when sesame meal contributed even up to 62.5% of the dietary crude protein. While Hasan and Khandaker (2000) observed a survivability of 98% in broilers fed sesame oil cake at 10% level along with different protein concentrate mixtures compared to fish meal diet group (95%).

Veena Grover *et al*. (2001) studied the associative effect of certain protein cakes like mustard cake, sesame cake, raw guar meal and cottonseed cake in broiler diets. The overall mortality was only 2.32% and they concluded that the different dietary treatments containing the oil

cakes had no significant effect on mortality. However, Majumder and Samanta (2001) studied the effect of replacement of fish meal by sesame cake protein and/or rapeseed cake and reported that there was 3 to 5% mortality as the sesame cake protein increased from 75 to 100% level replacing fish meal in broiler rations.

Recommended Level of Inclusion

Baghel and Netke (1987) inferred that a combination of 23.5% soyabean extraction and 28.2% sesame meal as a protein supplement in broiler ration was economical and gave maximum performance in broilers. Rajasekhara Reddy and Eshwariah (1989) reported that the fish meal can be successfully replaced with soyabean and sesamum cakes up to 75 per cent level without supplemental lysine and methionine. Similarly, Bell *et al*. (1990) observed that the sesame seed meal may provide an acceptable alternative to soyabean meal in broiler ration when the substitution level is 15% or less.

Kuldeep Singh and Thakur (2000) reported that the inclusion of 7.5% sesame cake along with 5% mustard cake + 5% guar meal toasted + 4% sunflower seed meal in broiler ration proved numerically superior to control group containing groundnut cake. Majumder and Samanta (2001) reported that the growth in the broiler chicks by replacing fish meal with vegetable protein (sesame cake) is feasible up to 50 and 75% levels with addition of enzymes for better performance.

Cost Effectiveness

Baghel and Netke (1987) reported that when 23.5% soyabean meal extraction and 28.2% sesame meal was mixed as a protein supplement in broiler ration, the cost of feed per kg body weight gain was found to be lowest (Rs. 4.07/kg gain) compared to soyabean meal alone fed groups (Rs. 5.18/kg gain). Ramasubba Reddy and Eswaraiah (1991) reported that the cost of production in broiler was marginally high in birds fed with groundnut meal or soyabean meal alone compared to birds fed on soyabean meal and sesame oil cake.

Aziz *et al*. (2001) reported that the net profit was higher in broilers fed 18.14% soyabean meal and 11% sesame oil cake totally replacing fish meal when compared to 14% fish meal diet groups. Majumder and Samanta (2001) reported that the addition of sesame oil cake replacing fish meal with or without enzyme supplementation in broiler diet was found to be economical than birds supplemented with fish meal alone.

Based on the review the sesame oil cake can be used in poultry ration.

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