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Cost effectiveness of commercial broilers reared with different levels of soya oil cake

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Abstract
A study was undertaken in broiler chicken to assess the effect of dietary supplementation of soya oil cake on cost-effectiveness of commercial broiler chicken fed with different levels of soya oil cake in environmentally controlled housing system. Two hundred and fifty commercial sexed, one day-old, broiler chicks were randomly grouped into five treatments with five replicates containing ten chicks per replicate. The treatment groups were fed with basal diet with supplementation of 100 per cent vegetable oil (rice bran oil-T_1) and rice bran oil is replaced with 25 per cent soya oil cake (T_2), 50 per cent soya oil cake (T_3), 75 per cent soya oil cake (T_4) and 100 per cent soya oil cake (T_5). At the end of experiment, cost of feed for producing one kg live weight of broiler was lowest in T_3 (Rs.52.91) and T_4 (Rs.53.30) groups and highest in T_5 group (Rs.55.07). The net profit of feeding soya oil cake in broiler diet at five weeks of age was highest in T_3 (50% SOC: 50% RBO) and T_4 (75% SOC: 25% RBO) groups and they had better profit over control groups.

Keywords: Soya oil cake, cost of production, broilers

Introduction
The poultry sector in India has undergone a paradigm shift in structure and operation from a mere backyard activity into a major commercial agro-based industry over a period of four decades. Poultry is an important sub-sector of agriculture and has contributed enormously to food production by playing a vital role in the domestic economy. It has great potential and can play a significant role in the national economy by contributing to food security of the country, reducing pressure on demand for mutton and beef and earning of foreign exchange.

Tremendous technical work has gone into broiler production in the fields of genetics, nutrition, breeder management, hatchery management, housing, and disease management. Feed contributes to the major input cost involved in poultry production. In order for a feed ingredient to be considered an important component of an industry feeding program, it must have several fundamental qualities. First, it must provide one or more important nutrients. Second, it must be available in amounts that allow it to be used regularly and on a large scale and third, it must be cost effective. Broiler chickens are usually fed on an ad libitum basis to allow them to get their energy needs and to achieve their target weights in shorter periods of time. In recent years, however, timed feeding of broilers has been recommended for economic reasons. Fat or oils as energy-rich feed are available from cereal sources such as rice bran oil, palm oil, sunflower oil. Incorporation of conventional feed ingredients like maize, soybean meal, fish meat etc. in poultry feed has increased the cost of feed enormously. With the current shortage and raising costs of conventional feed ingredients, scientists have advocated the use of agro-industrial by-products as unconventional feedstuff, as they are cheaper and available in large quantities in countries with agro-based economies which will benefit poultry farmers. Soya oil cake is unconventional feedstuff, produced by hydrogenation of soya oil along with catalyst. Soya oil cake has long shelf life, high level of gross energy (9405 kcal/kg), less than 0.5 per cent moisture and less than 2 per cent free fatty acid (as oleic acid) compared to other vegetable oils. Broiler chicken converts feed to meat most efficiently when they are given consistently optimum environmental conditions, with a temperature being the most critical factor. Prevailing conditions of increasing ambient temperature and the system of rearing in tropical countries are the major concern in broiler production. The objective is to provide an environment to maximize flock performance, achieving optimum and uniform growth rate and feed efficiency in meat yield while ensuring the bird's health and welfare are not compromised. Future of the broiler industry may increasingly depend on environmentally controlled poultry house rather than on open-sided poultry house, due to conditions like global warming.

Materials and Methods

The biological experiment was carried out with two hundred and fifty day-old, sex separated, commercial broiler chicks belonging to single hatch. The broiler chicks were wing banded, weighed and randomly allotted into five treatment groups with five replicates of 10 chicks in each replicate with each replicate having an equal number of male and female chicks. The treatment groups of the experiment were given in table-I

Table 1: The treatment groups of the experiment

Treatment groups	Experimental diets	Number of replicates per treatment	Number of birds per replicate	Total number of birds per treatment
T_1	Basal diet (100% vegetable oil)	5	10	50
T_2	Basal diet (25% vegetable oil replaced with soya oil cake)	5	10	50
T_3	Basal diet (50% vegetable oil replaced with soya oil cake)	5	10	50
T_4	Basal diet (75% vegetable oil replaced with soya oil cake)	5	10	50
T_5	Basal diet (100% vegetable oil replaced with soya oil cake)	5	10	50
Total number of birds				250

Relative economics of broilers fed with different levels of soya oil cake was worked out by using the prevailing market rates to evaluate the cost effectiveness.

Results and Discussion

The data on cost effectiveness of broiler chicken as influenced by feeding different levels of soya oil cake at five weeks of age in environmentally controlled house is presented in table II. The total feed cost per bird was highest in group T_4 (Rs. 103.40) followed by group T_3 (Rs. 99.47) and lowest in group T_2 (Rs. 96.90). The return over feed cost per bird ranged from Rs. 17.88 to Rs. 22.73. The return over feed cost per bird was highest in group T_3 (Rs. 22.73) and the lowest in group T_5 (Rs. 17.88). The results were in accordance with the earlier works of Nitsan *et al.* (1997) [3], Ali *et al.* (2001) [1], Tabeidian *et al.* (2005) [6], Barbour *et al.* (2006) [2], Owoahene *et al.* (2016) [4] and Swarna *et al.* (2017) [5] who also observed that addition of soyabean oil in the diet showed better result for cost effectiveness.

Table 2: Cost effectiveness of broiler chicken influenced by dietary supplementation of different levels of soya oil cake at fifth week of age

Treatment groups	Average body weight (kg)	Feed consumed (kg)	Cost of soya oil cake (Rs.)	Cost of feed /kg (Rs)	Total feed cost / bird (Rs)	Cost of feed/kg live weight (Rs)	Total income/bird (Rs)	Return over feed cost (Rs)
T_1	1.80	2.87	0	34.44	98.83	54.91	117.00	18.17
T_2	1.79	2.82	0.62	34.36	96.90	54.13	116.35	19.45
T_3	1.88	2.9	1.24	34.30	99.47	52.91	122.20	22.73
T_4	1.94	3.02	1.86	34.24	103.40	53.30	126.10	22.70
T_5	1.80	2.90	2.48	34.18	99.12	55.07	117.00	17.88

Price of one kg live weight of broiler: Rs. 65/kg
Price of soya oil cake/kg: Rs. 60/kg

Conclusion

The cost of feed for producing one kg live weight of broiler was found lowest in T_3 (Rs.52.91) and T_4 (Rs.53.30) groups and it was highest in T_5 group (Rs.55.07). The cost effectiveness of soya oil cake in broiler diet at five weeks of age was highest in T_3 (50% SOC: 50% RBO) and T_4 (75% SOC: 25% RBO) treatment groups and resulted in better profit over control group. It could be concluded that soya oil cake could be replaced with any other vegetable oil up to 75 per cent for higher profit.

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