Original Research

Effect of Replacement of Maize with Dry Bakery Waste with or without Lysophospholipid in Broiler Diet

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Abstract

The trial was conducted on 240-day-old broiler chicks for a period of six weeks. The day old chicks were randomly divided into four equal groups viz. T_0, T_1, T_2 and T_3 comprising of 60 birds each, which was further sub-divided into three replicates of 20 birds each. Group T_0 was control and received corn-soybean based diet. The birds from groups T_1 received diet in which maize was replaced with dry bakery waste at 50% level. The birds from group T_2 and T_3 received diet in which maize was replaced with dry bakery waste at 50% level with 0.05 and 0.1% lysophospholipid, respectively. The replacement of maize with dry bakery waste with or without lysophospholipid @ 0.05 and 0.1% level in the broiler diets showed significantly ($P<0.05$) higher live body weight and live weight gain. The feed consumption was significantly ($P<0.05$) higher and better FCR was observed in treatment group. Also, significant difference ($P<0.05$) were observed in carcass studies like dressing percentage ($P<0.05$) but giblet weight showed no significant difference. The serum lipid profile was comparable among all the experimental groups. The net profit from group T_3 was found to be highest followed by T_2 and T_1 as compared to control.

Key words: Broiler Birds, Dry Bakery Waste, Emulsifier, High Fat, Performance, Unconventional Feedstuff

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Introduction

The unconventional feed sources play a key role in reducing cost of feed by replacing the proportion of conventional feed ingredients. Bakery waste (BW) an unconventional energy source, is found in substantial quantities in Bakeries located at different biscuit manufacturing industries. It is a palatable, high energy feed produced from wheat flour, skimmed milk powder, vegetable fat, sugar, salt and flavor materials. Supplementing broiler diets with fats and oils as an extra energy source has become common practice in the industry. However, young birds are deficient in the enzymes necessary for efficient digestion.

Lysophospholipid (LPL) have superior emulsification properties due to formation of smaller micelles (Avitech, Technical Bulletin, 2009). External supplementation of LPLs improves the emulsification of fat and absorption of fat. The dry bakery waste found to content 10.11% fat depending on the source of material. Hence, the present study is planned to study the effect of replacement of maize with dry bakery waste at 50% level with or without supplementation of lysophospholipidin broiler diet.

Materials and Methods

The experiment was conducted for 42 days on 240, day-old broiler chicks, which were randomly distributed into four equal groups viz. T_0, T_1, T_2 and T_3 with each group having 60 chicks. The individual groups were further subdivided into three replicates of 20 chicks each. The birds received pre-starter, starter and finisher feed as per BIS (2007). Pre-starter was offered for first week and then starter mash was offered upto the end of third week and finisher feed was offered upto the end of six weeks. The group T_0 (control) received standard broiler diet as per BIS (2007), group T_1 received diet in which maize was replaced with dry bakery waste at 50% level, group T_2 and T_3 were fed with diet in which maize was replaced with dry bakery waste at 50% level with 0.05% and 0.1% lysophospholipid, respectively. All the chicks were kept hygienically on deep litter system in separate pens and reared adopting uniform management conditions. The brooding was carried out for first two weeks by using electric bulbs. The standard vaccination schedule was followed for birds from all the experimental groups.

The weight of the individual experimental chicks was recorded using digital weighing balance at day old and thereafter at weekly interval till six weeks of age. The scale with 0.5 g accuracy was used in digital weighing balance. The records maintained for daily feed consumption were used to arrive at average weekly feed consumption and feed conversion ratio (FCR). Two birds from each replicate were slaughtered at the end of experimental period and utilized for carcass evaluation studies. The serum from two broiler birds of respective replicates and groups were collected in a sterile vial for lipid profile. The analysis of serum lipid profile was carried out with the help of Bio- analyzer by using appropriate kits. The proximate analysis of feed sample will be analyzed as per AOAC (2000). All the data obtained were subjected to statistical analysis as per Snedecor and Cochran (1994) by using completely randomized block design.

Results and Discussion

The proximate composition (%DMB) of dried bakery waste is presented in Table 1. The overall performance of birds during six weeks period is presented in Table 2.The treatment groups showed significantly ($P<0.01$) higher body weights as compared to control. Among the treatment groups it was highest in group T_3 followed by T_2 and T_1, however, it was comparable in group T_2 and T_1. The findings of the present study are in agreement with Epao (2015) who reported numerically higher body weight in the broilers fed on diet containing replacement of maize with dry bakery waste at 20, 40 and 60% level.

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Malapure*et al*. (2011), reported increase body weight of broilers fed on diet supplemented with lysophospholipids.

Table 1: Proximate composition (%DMB) of bakery waste

S. No.	Nutrient	Percentage
1	Moisture	5.56
2	Crude Protein	9.5
3	Ether Extract	10.11
4	Crude Fiber	2.1
5	Total ash	6.12
6	Nitrogen Free Extract	72.17

Table 2: The overall performance of birds during six weeks

Parameters	Groups				
	T_0	T_1	T_2	T_3	Sign.
Initial weight (g)	43.9 ± 0.55	44.12 ± 0.62	42.7± 0.61	43.55 ± 0.28	
Final weight (kg)	2006.55^{a} ± 3.23	2368.74^{b} ± 20.76	2387.42^{b} ± 39.88	2512.26^{c} ± 42.67	**
Total gain in weight (kg)	1962.65^{a}± 2.99	2324.63^{b}± 20.95	2344.72^{b} ± 40.45	2468.71^{c}± 42.87	**
Total feed consumption (kg)	3706.05^{a}±16.79	4153.67^{b} ± 27.44	4042.99^{c} ± 44.98	4325.56^{d} ± 30.75	**
Average feed conversion ratio	1.89a ± 0.1	1.79b ± 0.1	1.73^{b} ± 0.09	1.75^{b} ± 0.09	**
Dressing %	69.61^{a} ± 0.14	70.00^{a} ± 0.06	70.70^{b} ± 0.27	71.37^{b} ± 0.35	**
Giblet (%)					
Liver weight (g)	2.37 ± 0.16	2.05 ± 0.06	2.24 ± 0.03	2.30 ±0.08	NS
Gizzard weight (g)	2.48 ± 0.32	2.13 ± 0.023	2.10 ± 0.11	2.03 ± 0.17	NS
Heart weight (g)	0.80 ± 0.01	0.78 ± 0.08	0.70 ± 0.1	0.62 ± 0.08	NS
Lipid Profile (mg/dl)					
Total Cholesterol	106.67±15.21	110.0 ± 10.12	122.0 ± 12.9	102.33 ± 9.14	NS
Triglycerides	44.67 ± 18.98	48.33 ± 7.51	39.33 ± 5.55	48.67 ± 11.47	NS
HDL	66.38 ± 6.75	77.00 ± 8.04	78.9 ± 1.61	63.50 ± 10.54	NS
LDL	27.83 ± 9.06	23.60 ± 4.00	34.07 ± 11.27	28.23 ± 5.16	NS
Economics					
Net profit per bird (Rs.)	6.01	31.68	36.46	37.78	
Net profit per kg (Rs.)	3	13.36	15.25	15.05	

*Means with different superscript in a row differ significantly; NS: Non- significant;**Significant at 1% level*

The average weight gain of the birds from treatment groups was significantly (P<0.01) higher as compared to control. Among the treatment groups it was highest in group T_3 followed by T_2 and T_1, however, it was comparable in group T_2 and T_1. The findings of the present study corroborate with findings of Roy *et al.* (2010) who reported higher gain in body weight in emulsifier supplemented group. These result may be attributed to the better utilization of nutrients in the dry bakery waste fed groups. The addition of emulsifiers to diets containing dry bakery waste might have increased ether extract digestibility of fat from bakery waste which in turn might have resulted in better weight gain. The supplementation of lysophospholipid in the bakery waste groups showed better performance at the higher level of supplementation (0.1%)

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indicating higher nutrient digestibility with increased level of lysophospholipid. The cumulative feed consumption of birds from treatment groups was significantly (P<0.05) higher than control and among treatment groups it was highest in group T_3 followed by T_1 and T_2., however, between group T_1 and T_2 it was significantly (P<0.01) higher in group T_1 than T_2. This indicated that the group in which maize was replaced by dry bakery waste at 50% level consumed more feed than the control irrespective of lysophospholipid supplementation may be attributed to higher weight gain in these respective groups. The findings of the present study are in agreement with Zaefarian *et al.* (2015) who reported increase feed consumption in broiler supplemented with lysolecithin in the diet.

The cumulative FCR of the treatment group was significantly (P<0.01) better as compared to control, however, it was comparable among treatment groups. Thus, the results of present study indicated that FCR of groups received dry bakery waste replacing maize at 50% level with or without lysophospholipid was better than the control group. This may be due to better nutrient metabolisability in the treatment group. The results of present study are in agreement with Adeyemo *et al*. (2013) who found significant difference in FCR with birds fed on 50%, 75% and 100% bread waste. Malapure *et al.* (2011) reported better FCR in broilers supplemented with lysophopholipid @ 0.05 & 0.1% in broiler diet. However, Torki and Kimiaee (2011) reported non-significant effect of bakery by-product on FCR in layer birds. The average dressing percentage was significantly (P<0.05) higher in group T_2 and T_3 than control and T_1 group. Tony *et al.* (2007) who reported higher dressing percentage in lysophospholipid supplementation groups in broiler. This may be attributed to the improvement in the overall performance as result of proper nutrient utilization and its absorption due to supplementation of lysophospholipid.

However, findings of the present study are not matching with Epao (2015) who reported non-significant effect on dressing percentage when dry bakery waste was used at 20, 40 and 60% replacing maize in broiler diet. The average liver, gizzard and heart weight percentage of birds from groups T_0, T_1, T_2 and T_3were comparable. Findings of the present study corroborated with Abou-Elkhair *et al.* (2015) and Roy *et al.* (2010). The average serum cholesterol, triglycerides, LDL and VLDL values of birds from group T_0, T_1, T_2 and T_3were comparable. The results obtained in the present study are in agreement with Melegy *et al.* (2010) and Abou Elkhair *et al.* (2015) who reported non-significant effect on serum cholesterol and triglycerides values after supplementation of emulsifier in broiler diet. The economics of broiler production indicated that the birds from group T_3 recorded highest profit per bird followed by group T_2 and T_1 than control group which recorded least profit.

Conclusion

It is concluded that the replacement of maize with dry bakery waste found to be suitable alternative feed source in the broiler diet. The supplementation of lysophospholipid @ 0.05 level improved the performance of broiler birds and also resulted into better margin of profit.

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