



Effect of Supplementation of Both Dried Poultry Excreta and Probiotics on the Performance of Broilers

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Received: 16 June, 2019

Revised: 02 July, 2019

Accepted: 6 July, 2019

ABSTRACT

The objective of this study was to evaluate the influence of DPE and probiotics on performance of commercial broiler chicks. Three DPE levels (without DPE, with DPE 5% and DPE 10% supplementation) as well as Two probiotic levels (without and with P supplementation) were considered for the study. The experiment consisted of two replicates for DPE groups. The performance of broiler was evaluated in terms of growth and feed efficiency at 6th week of age. Data were analyzed on survivor and equal number of bird's per subclass basis. Analysis of variance revealed that the difference between replicates were not significant for the different traits under study as such all subsequent analysis was performed. Inclusion of DPE and probiotics in diet had significant effect. Group of chicks fed with diet DPE were significantly heavier than those fed with diet without DPE at second week body weight. It indicates that the DPE supplementation had weighty effect on early growth of chicks. The Overall feed efficiency also showed the similar trend as was obtained for weekly feed efficiency. The analysis indicated that the inclusion of DPE and probiotics in the diet significantly affected the weekly feed conversion efficiency. Inclusion of probiotics and DPE revealed significant effects on body weight. Chicks showed higher body weight with diet having DPE and probiotics.

Keywords: Probiotic, DPE, Performance, feed efficiency, Chicks

Probiotics have been introduced as an alternative to antibiotics. The use of antibiotics as routine feed additives has been banned in some countries because of public concern over possible antibiotic residual effects and the development of drug-resistant bacteria. The commercial use of probiotics in poultry industry is relatively new. Probiotic represents a single or mixed culture of live microorganisms which when applied to animals, affects the host beneficially by improving the properties of indigenous microflora. Probiotics come under the category of as generally recognized as safe (GRAS) ingredients classified by Food and Drug Administration (FDA). They have no side and residual effects. Probiotics regulate the microbial environment in the gut, reduce digestive upsets and prevent pathogenic gut bacteria, thereby improve live weight gain, improve feed conversion ratio, reduce mortality, increase feed conversion ratio in layers and increase egg production. Probiotics commercially available contain strains of genera lactobacillus (mainly),

Bifidobacterium, Streptococcus, Bacillus, Bacteroides, Pediococcus, Leuconostoc, Propionibacterium, Saccharomyces cerevisiae and *Aspergillus oryzae*.

Broiler production from 14 million in 1971 to about 2000 million in 2005 and total poultry meat production has increased from 70,000 MT in 1971 to 1900,000 MT in 2005 from 2000 million birds (FAO, 2006). The per capita availability of eggs per year has increased from seven in 1961 to 44 in 2004-05, and poultry meat from 160 g to about 1900 g during the same period. Due to increase in human population, production of eggs and poultry meat did not result in similar increases in per caput consumption.

The production level of grains is not increasing proportionally to meet out the demand. Hence, the sparing capacity will influence the future growth of the poultry

How to cite this article: Bansal, G.R. (2019). Effect of supplementation of both dried poultry excreta and probiotics on the performance of broilers. *J. Anim. Res.*, 9(4): 01-06.

industry which necessitate for the search of alternative feed resources such as crop and industry byproducts, organic wastes, aquatic wastes, marine wastes etc. This huge amount of waste may be recycled in order to provide nutrients for growing of crops and keeping the pollution free environments. More over these wastes are managed and processed appropriately in relation to the economic viable potency of poultry operation which may be enhanced.

MATERIALS AND METHODS

The experiment was conducted to study the influence of probiotics DPE and (P) on the performance of day old sexed four hundred and eighty commercial broiler chicks. A group of twenty broilers distributed in 12 treatments replicated twice. The chicks were reared in electric battery brooders under same environmental conditions. These chicks were allotted at random to each treatment.

The composition of experimental ration having 0, 5 and 10 per cent Dried Poultry Excreta is given in the Table 1.

Table 1: Composition of experimental ration

Ingredients	D0 (0% DPE)	D1 (5% DPE)	D2 (10% DPE)
Maize	56	56	56
DORP	05	02	—
Soya-Cake	15	14	08
GNC	11	12	13
Jawala Fish	10	08	10
Min. Mix.	2.5	2.5	2.5
Vit. Mix.	0.5	0.5	0.5
DPE	—	5	10
Total	100	100	100

The probiotic named “Bioboost – YC” each gram provides Live Yeast Culture (Strain SC-47), will be used as culture containing 20 million CFU kg⁻¹

Observations

Data pertaining to performance traits such as growth, feed efficiency, and body weights were recorded by weighing individual chicks at weekly interval up to 6th weeks of age. Chicks were fed experimental ration *ad-libitum*. Difference in initial and final body weight represented

the weight gain by chicks over the corresponding period. Weighed amounts of diet were provided to chicks. Feed consumed and weight gain was recorded weekly. The per cent mortality was also regularly recorded for each group.

Traits measured

The following traits were measured for comparative evaluation and their interaction effects of all treatments: -On weekly basis 1. Body weight (gm.) 2. Feed efficiency.

The following recording and sampling procedures were adopted during the experimental period.

Feed intake

The weekly records of the feed offered and residual amounts of weigh backs were maintained for each replicate to calculate the feed consumption per bird.

Body weight

The birds were weighed individually at weekly intervals and the body weights were recorded to calculate body weight gains.

Feed conversion ratio

The feed conversion ratio was calculated as follows:

$$FCR = \frac{\text{Total feed consumed (g)/bird}}{\text{Total body weight gain (g)}}$$

Mortality

Daily observations were made to record the occurrence of deaths in different experimental treatments.

Cost of broiler production

The cost of rising 6 weeks broilers under different treatments include the cost of day old chick, feed, probiotic and cost of labor. Cost of other inputs was not included in this study.

Statistical analysis

The data collected under study were analyzed as 3x2x2

factorial completely randomized design according to Steel and Torrie (1980).

RESULTS AND DISCUSSION

Effect of DPE and Probiotics on performance of broiler:

Body weight

The DPE supplementation with the grains helps to improve the growth significantly as reported by many earlier workers.

SECOND WEEK: At two weeks of age the mean body weight recorded at 0,5 and 10 per cent DPE level of diet. Differences between these levels were significant. At this age, body weight was highest for the groups received the 5 per cent DPE level of diet.

SIXTH WEEK: The body weight of chicks at 6th weeks of age was found nonsignificant effect of DPE in the diet. The body weight also showed similar trend. More or less similar body weight was recorded for 0, 5 and 10 per cent DPE level of diet. However, tendency of higher body weight at 5 per cent DPE level was also noticed at this age of body weight.

GROWTH: The overall means for weekly body weights along with standard error measured for commercial broiler chicks have been presented in Table 2 and 3.

Jadhav *et al.* (1994) incorporated the safe and economic level of DPD (5,7.5 and 10 % DPD) and found that body weights were not significantly different among the treatment but the diet containing 5 per cent DPD showed increased live body weight as compared to 10 per cent DPD diet due to improved metabolism of the former diet. These findings are in good agreement with the findings of the present experiment. However Nambi *et al.* (1992) reported significantly lower body weight of broilers on or above 5 per cent DPD in diet.

The performance of broiler was evaluated in terms of growth (weekly body weight from day old to 6 week of age), feed efficiency and percent mortality at 6th week of age. Data were analyzed on equal number of bird's per subclass basis. Analysis of variance revealed that the difference between replicates were not significant for the different traits under study as such all subsequent analysis was performed. The beneficial effect of probiotic supplementation to broiler diet in terms of increased body weight and body weight gain is well documented in literature (Banday and Risam, 2001). Similar findings as observed in the study for effect of probiotics on growth performance were reported by (Jin *et al.*, 2000; Yu *et al.*

Table 2: Growth performance of commercial broiler chicks due to DPE effects on weekly basis

FACTORS	Day old	I week	II week	III week	IV week	V week	VI week
DPE D0	42.24	103.76	234.71 ^{ab}	352.59	628.72 ^a	960.00	1090.38
D1	43.24	102.31	246.81 ^b	353.03	664.83 ^b	969.07	1110.75
D2	42.97	101.34	229.24 ^a	345.65	661.36 ^b	962.42	1097.42
SE Range	0.37-0.41	0.34-0.37	2.38-2.55	2.48-2.55	3.14-3.50	3.66-4.10	4.66-5.10

*Means having similar super-scripts do not differ significantly.

Table 3: Growth performance of commercial broiler chicks due to Probiotic effects on weekly basis

Factors	Dayold	I week	II week	III week	IV week	V week	VI week
Prob. P ⁰	42.33	106.01	264.85	375.30 ^a	669.93	957.30 ^a	1073.92 ^a
P ¹	42.69	106.35	266.34	384.34 ^b	694.93	1029.61 ^b	1232.70 ^b
SE Range	0.43-0.44	0.44-0.47	3.12-3.76	2.72-3.16	3.89-4.15	4.05-4.85	5.81-6.45

*Means having similar super-scripts do not differ significantly.

2003; Murry *et al.*, 2004; Sieo *et al.*, 2005; Apata *et al.*, 2008). Results reported by (Samli *et al.*, 2007) that highly significant differences were observed between control and probiotic supplemented groups with respect of total weight gain was in close agreement with the observation in the present study. Supplementation of *E. faecium* enhanced broiler chick performance with respect to weight gain and FCR Concluded by (Samli *et al.*, 2007).

The probiotics supplementation enhanced the body growth rate of chicks also observed by (Fallah *et al.*, 2013; Rahman *et al.*, 2013). The results of the study, probiotic, Biogen, up to 1 kg/ton⁻¹ improved the growth performance of the broiler chicken concluded by (Mahmoud *et al.*, 2017; Ahmed *et al.*, 2017),

Effect of DPE and Probiotics on Feed consumption and feed efficiency

The weekly feed efficiency exposed highly significant effect of DPE at all ages except at 6th weeks of age. Better feed efficiency was obtained for the groups of chicks those fed with diet without inclusion of DPE. Inclusion of 5 per cent DPE in diet also showed significantly better feed efficiency than the 10 per cent DPE level. This trend clearly indicates that higher level of DPE in feed results in higher feed conversion.

The Overall feed efficiency also showed the similar trend as was obtained for weekly feed efficiency. The overall feed efficiency obtained were 1.96, 1.96 and 2.00 respectively at 0, 5 and 10 per cent DPE dietary groups.

The overall Feed Efficiency along with standard error measured for commercial broiler chicks have been presented in Table 4 and 5.

The inclusion of DPE in the diet indicated significant effect on weekly feed efficiency. On overall feed efficiency basis, it indicated that the broilers fed on diet containing 10 per cent DPE required more feed than the control as well as 5 per cent DPE. The feed efficiency of the broiler fed on DPE diets was not significantly different from that of control for 6th week feed efficiency, showing more or less similar feed efficiency of the broilers on different experimental diet. The broilers fed on diet containing 5 per cent and 10 per cent DPE also resulted significant difference between them for 2nd, 3rd and 4th weeks feed efficiency whereas for 5th week, nonsignificant difference was observed. It reveals that at higher ages, these two DPE dietary levels showed similar feed to gain ratio. These findings are in close agreement with the findings of Khire *et al.* (1983) who also reported significant difference for feed conversion efficiency for the broilers fed with all levels above 5 per cent DPE in the diet which reduced the feed efficiency.

Table 4: Feed Efficiency of commercial broiler chicks due to DPE effects on weekly and overall basis

Factors	I week	II week	III week	IV week	V week	VI week	Overall FE
DPE D0	1.62	1.65 ^a	1.76 ^a	1.96 ^a	2.15 ^a	2.26	1.96 ^a
D1	1.62	1.67 ^b	1.77 ^b	1.97 ^b	2.16 ^b	2.26	1.96 ^a
D2	1.63	1.68 ^c	1.78 ^c	1.98 ^c	2.16 ^b	2.27	2.00 ^b
SE Range	0.003-.005	0.003-0.01	0.004-.005	0.002-.004	0.004-.005	0.01-0.03	0.05- 0.08

*Means having similar super-scripts do not differ significantly.

Table 5: Feed Efficiency of commercial broiler chicks due to Probiotics effects on weekly and overall basis

Factors	I week	II week	III week	IV week	V week	VI week	Overall FE
Prob. P ⁰	1.63	1.68 ^b	1.78 ^b	1.97	2.16 ^b	2.26	2.12 ^b
P ¹	1.62	1.66 ^a	1.77 ^a	1.97	2.15 ^a	2.26	1.84 ^a
SE Range	0.003-.004	0.003-.004	0.003-0.04	0.003-.004	0.002-.003	0.01-0.02	0.04-0.05

*Means having similar super-scripts do not differ significantly.

The present findings are in agreement with the findings of (DaSilva *et al.*, 2000; Zulkifli *et al.*, 2000; Senani *et al.*, 2000; Kim *et al.*, 2001; Gupta *et al.*, 2003; Manna *et al.*, 2003; Sharma *et al.*, 2003). They observed that the feed efficiency ratio were lower in probiotic fed group than control. They observed that broilers diet supplemented with probiotic showed improved feed intake than the control. This can be substantiated from the fact that the experimental birds had consumed significantly more feed than control ones due to increased digestive efficiency.

The Various Studies revealed that the broilers fed with probiotics significantly improved feed to gain ratio of the broilers. Present findings also indicated significantly better weekly feed conversion efficiency, when the probiotic was supplemented in the diet of commercial broiler chicks (Banday and Risam, 2001; Sieo *et al.*, 2005; Karaoglu and Durdag, 2005; Onderci *et al.*, 2006; Gunal *et al.*, 2006; Ahmad, 2006; O’dea *et al.*, 2006; Onderci *et al.*, 2007). The *Saccharomyces cerevisiae* was used as a probiotic in the diet and added at the normal recommended rate in the various combinations of the diet and it was found that the diet supplemented with probiotic preparation had superior overall feed utilization efficiency than the control. The weekly feed efficiency exposed significant effect of enzyme for weekly feed efficiency. Averaged overall other effects, the enzyme was also found to have significant effect on over all feed efficiency and the trend remained same as was found for weekly feed efficiency. The results of the study, probiotic, Biogen, up to 1 kg/ton-1 improved the feed efficiency of the broiler chicken concluded by (Fallah *et al.*, 2013; Rahman *et al.*, 2013; Mahmoud *et al.*, 2017; Ahmed *et al.*, 2017),

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