

Effect of a Graded Levels of Probiotic Feed Supplementation on the Performance in Commercial Broiler Chicken

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ABSTRACT

The study was conducted to assess the probiotic supplementation, fed to a total of 240 day old commercial broiler chicks from day 1 to 42 days of age and to evaluate the body weight gain, feed consumption, feed conversion ratio. The trial results revealed that, the overall gain at 42 days with dietary supplementation of probiotic and antibiotic (300+100g/ton) yielded significantly ($P<0.05$) highest body weight gain (1700g) followed by commercial probiotic (200g/ton) (1691g) and probiotic (1685g) compared to control (1514g) during the overall period. The feed consumption during the period is significantly ($P<0.05$) higher with supplementation of probiotics or a combination of probiotic and antibiotic compared to control. The differences in the feed efficiency (kg of feed/kg gain) were significant among the probiotic (1.856) probiotic and antibiotic (1.694), commercial probiotic (1.715) and control (1.803) during over all experimental period. All dietary supplements did not have significant ($P>0.05$) effect on various carcasses parameters, except breast yield. The breast yield was significantly ($P<0.05$) lower in probiotic, at 42 days, while the rest of the treatment groups did not differ from control. Mortality was more in commercial probiotic added group. However, the mortality rate was within the limits and no specific disease was recorded. It can be concluded that, supplementation of probiotics as alternative to antibiotic can be used for improving performance of broiler chicken.

Keywords: Broilers, probiotics, performance, carcass parameters

Problend is proprietary commercial probiotic product, prepared by biofactor inputs private limited company, Hyderabad. It is a Live microbial feed supplements which imparts beneficial effect to host by improving its intestinal microbial balance. Their mode of action is by “competitive exclusion of harmful pathogens”. It is a mixture of *Bacillus* spp. (*B. megaterium*, *B. subtilis*, *B. clausii*, *B. pumilus*, *B. licheniformis*, *B. polymyxa*, *B. amyloliquifaciens*) *Lactobacillus* spp. (*L. sporogenes*, *L. casei*, *L. acidophilus*, *L. rhamnosus*, *L. bulgaricus*) and yeast culture (*S.cerevisiae*, *S.boulardi*). The probiotic is reported to regulate gut integrity,

enhance useful microbial environment, reduce digestive disorders, improve nutrient absorption and utilization, improves immunity, increases production and check the mortality. The supplementation of probiotic to the diet significantly improved the live weight and feed conversion ratio of the chicken (Roosbeh Shabani *et al.*, 2012b).

MATERIALS AND METHODS

A total of 240 Commercial broiler birds were randomly allotted to 48 battery brooder cell with an average floor space of 82 square inches per

bird. Probiotic (Problend) was supplemented to a maize-soyabean meals diet at 6 graded levels each (100, 200, 300 g/ton of probiotic, 200g/ton of commercial product and a probiotic (300 g/ton) + antibiotic (100 g/ton) against a basal diet. All the 6 diets (Table 1) were *Iso-nitrogenous* and *Iso-caloric*. The Nutrient composition of dietary treatments were given in (Table 2). Each diet was fed *ad libitum* to 8 replicates consisting of 5 birds per replicate. The chicks were reared under uniform conditions upto 6 weeks of age and individual body weight of chicks and replicate-wise feed intake were recorded at weekly intervals throughout the experimental period and weekly feed conversion

ratio was calculated. The weekly wise mortality were recorded. The data were analysed using General Linear Model procedure of Statistical Package for Social Sciences (SPSS) 15th version and comparison of means was done using Duncan’s multiple range test (Duncan, 1955) and significance was considered at P<0.05.

RESULTS AND DISCUSSION

The dietary inclusion of probiotic with or without and combination of probiotic and antibiotic at all the levels of incorporation results of body weight gain was

Table 1: Ingredient Composition of Basal Diets (in kgs) fed to the commercial broilers from 0-42 days

Ingredient	Prestarter (0-14d)	Starter (15-28d)	Finisher (29-42d)
Maize	53.7	56	59.1
Oil	1.6	4	4
Soyabean meal	40	35	32.2
Shell grit	1.65	1.83	1.75
Dicalcium phosphate	1.85	1.95	1.89
Salt	0.4	0.4	0.4
DL-Methionine	0.21	0.19	0.15
L-Lysine HCl	0.11	0.14	0.15
Trace Mineral Mixture	0.1	0.1	0.1
Vitamin AB2D3K	0.02	0.02	0.02
Vitamin B-Complex	0.025	0.025	0.025
Cocciostat	0.05	0.05	0.05
Antibiotic	0.05	0.05	0.05
Choline chloride (50%)	0.1	0.1	0.1
Toxin binder	0.1	0.1	0.1
Tylosine	0.05	0.05	0.05
Total	100	100	100
Nutrient composition			
ME(kcal/kg)	2911	3070	3106
Crude protein (%)	22.56	21.74	19.51
Lysine (%)	1.3	1.21	1.02
Methionine (%)	0.55	0.50	0.45
Calcium (%)	1.0	1.06	1.01
Available phosphorous (%)	0.45	0.46	0.45

*Vitamin premix provided per kg diet: Vitamin A 200000IU, Vitamin D3 3000IU, Vitamin E 10mg, Vitamin K 2mg, Riboflavin 25mg, Vitamin B1 1mg, Vitamin B6 2mg, Vitamin B12 40mg, and Niacin 15mg.

*Trace mineral provided per kg diet: Manganese 120mg, Zinc 80mg, Iron 25mg, Copper 10mg, Iodine 1mg and Selenium 0.1mg.

Table 2: Effect of dietary inclusion of *probiotic* at graded levels on Cumulative weight gain (g), Cumulative feed consumption (g/bird) and feed conversion ratio (FCR) of broiler chicken at 42 days of age

Diets	Levels (g/ton)	Cumulative body weight gain (g)	Cumulative feed consumption (g/bird)	Cumulative feed conversion ratio (FCR)
		0-42	0-42	0-42
Control	0	1514 ^b	2407 ^c	1.803
Probiotic	100	1664 ^a	2606 ^{ab}	1.715
Probiotic	200	1685 ^a	2431 ^{bc}	1.856
Probiotic	300	1641 ^{ab}	2635 ^a	1.716
Commercial Probiotic	200	1691 ^a	2536 ^{bc}	1.715
Probiotic and Antibiotic	(300+100)	1700 ^a	2617 ^a	1.694
N	8	8	8	8
P Value		0.055	0.026	0.275
SEM		19.66	26.121	0.919

insignificantly ($P < 0.05$) during first week. However the second week to six weeks of age at all the levels insignificantly effected by with or without probiotic and probiotic and antibiotic combination. The data on the growth performance of broiler chickens from first to six weeks of age on different diets have been presented in the Table 3. During the sixth week, highest body weight was observed with probiotic & antibiotic and commercial probiotic followed by probiotic compared with control. The significant ($P < 0.05$) improvement in body weight by feeding the combination of probiotic and antibiotic is in accordance with the earlier findings of Mohan (1991); Cho *et al.* (1992); Jin *et al.* (2000); Bai *et al.* (2012) and Abudabos *et al.* (2015). The present study shows that the data on cumulative feed consumption in broilers as influenced by different dietary treatment. The results revealed that, there was significant ($P < 0.05$) difference of feed intake in the fourth and sixth weeks. However, Baidya *et al.* (1994) and Roozbeh Shabani *et al.* (2012) observed a contradictory results in feed consumption. The combination of probiotic and antibiotic has significantly ($P < 0.05$) influence on feed consumption as compared to the control group which is in accordance with the findings of Sarmah Sankar *et al.* (2014) who observed that the diet supplemented with

antibiotic and probiotic @ 50g/100 kg of feed and a combination of antibiotic and probiotic @ 20 and 25g each/100 kg of feed showed no effect on feed intake

The present study shows that the data on feed conversion ratio in broilers as influenced by different treatments. The present experiment revealed that there was significantly ($P < 0.05$). difference was observed statistically between control and various experimental groups from first week to three weeks of age..However, the supplementation of probiotics in feed improved the feed conversion efficiency during the finisher phase when compared with the control group. The best feed conversion ratio was observed in broilers fed with probiotic supplemented in fifth week, where as it is observed that in sixth week best feed conversion ratio (1.694) was observed in probiotic and antibiotic fed group. The improvement in feed efficiency in this study with combination of probiotic and antibiotic is in agreement with the reports of Babu (1993); Baidya *et al.* (1994); Sarmah Sankar *et al.* (2014). But, El-Hammady *et al.* (2014) where the authors observed significant ($P < 0.05$) difference in feed efficiency which might be due to combined effect of probiotic and antibiotic supplementation. The supplementation of probiotics improved the breast yield.

There is significant ($P < 0.05$) difference was observed statistically between control and various experimental groups. Ashayerizadeh et al. (2009) reported that the breast yield significantly ($P < 0.05$) more in broiler fed the diet supplemented with probiotic compared to the birds fed either prebiotic or symbiotic. It can be concluded that supplementation of probiotic could alternative to antibiotic can be improving performance and breast yield in the commercial broiler.

CONCLUSION

Supplementation of probiotics was more effective among all the dietary treatments in terms of better immune response, and reduced *E. coli* counts in intestinal contents and excreta at 42 d of age. It can be concluded that, supplementation of probiotics as alternative to antibiotic can be used for improving performance of broiler chicken

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REFERENCES

- Abudabos, A.M., Al-Batshan, H.A. and Murshed M.A. 2015. Effects of prebiotics and probiotics on the performance and bacterial colonization of broiler chickens. *South African Journal of Animal Sciences*, **45**: 419-428.
- Ashayerizadeh, A., Dabiri, N., Ashayerizadeh, O., Mirzadeh, K.H., Roshanfekar, H. and Mamooee, M. 2009. Effect of dietary antibiotic, probiotic and prebiotic as a growth promoters, on growth performance, carcass characteristics and haematological indices of broiler chickens. *Pakistan Journal of Biological Sciences*, **12**: 52-57.
- Babu, M. 1993. Studies on the compatibility between probiotics and various growth promoters in Japanese quails (*Coturnix coturnix japonica*). Ph.D. Thesis submitted to the Tamil Nadu Veterinary and Animal Science University, Madras.
- Bai, S.P., Wu, A.M., Ding, X.M., Lei, Y., Bai, J., Zhang, K.Y. and Chio, J.S. 2012. Effects of probiotic-supplemented diets on growth performance and intestinal immune characteristics of broiler chickens. *Journal of Poultry Science*, **92**: 663-670.
- Baidya, N.L., Mandal, Sarkar, S.K. and Banerjee, G.C. 1994. Combined feeding of antibiotic and probiotic on the performance of broiler. *Indian Journal of Poultry Science*, **29**: 228-231.
- Cho. K.H., Lee. U.T., Yang. C.K., Ryu, D.Y., Kim, Y.S. and Yoon, Y.D. 1992. The effects of Lactobacilli Casei (TSC-66) on growth promotion in broiler chickens. *Korean Journal of Veterinary Public Health*, **16**: 55-59.
- El-Hammady, H.Y., El-Sagheer, M., Hassanien, H.H.M. and Hassan, H.A. 2014. Performance and carcass traits of broilers supplemented with probiotic or antibiotic (Neomycin) *Egyptian Journal of Animal Production*, **51**: 107-114.
- Jin, L.Z., Ho, Y.W., Abdullah, N and Jalaludin, S. 2000. Digestive and bacterial enzyme activities in broilers fed diets supplemented with lactobacillus cultures. *Poultry Science*, **79**: 886-891.
- Mohan, B. 1991. The effect of probiotic supplementation on growth and nitrogen utilization in broilers. M.V.Sc. Thesis submitted to Tamil Nadu Veterinary and Animal Sciences University, Madras.
- Roosbeh Shabani, Mehran Nosrati, Faramin Javandel, Ali Ahmad Alaw Gothbi and Hamed Kioumars 2012b. The effect of probiotics on growth performance of broilers. *Annals of Biological Research*, **12**: 5450-5452.
- Sarmah Sankar, Bhuyan Robin and Nath Rita 2014. Effect of Addition of Antibiotic, Probiotic and Their Combination on Growth Performance in Broiler Birds. *Indian Journal of Animal Nutrition*, **31**: 414-417.