PJN
ISSN 1680-5194

PAKISTAN JOURNAL OF NUTRITION

ANSInet
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan
Mob: +92 300 3008585, Fax: +92 41 8815544
E-mail: editorpjn@gmail.com

Pakistan Journal of Nutrition 13 (4): 219-222, 2014
ISSN 1680-5194

Effect of Different Levels of Biofeed (EM4) on the Performance of Broiler Chicks

A. Ali[1], A.R. Abid[1], Z.I. Chauhan[2], G. Ahmad[1], S. Muhammad[1] and J. Muhammad[3]
[1]Faculty of Animal Husbandry, University of Agriculture, Faisalabad, Pakistan
[2]Department of Livestock and Dairy Development, Punjab, Pakistan
[3]University Diagnostic Lab, University of Veterinary and Animal Sciences, Lahore, Pakistan

Abstract: A study was conducted to investigate the beneficiary effect of Biofeed microbial culture (EM4) in poultry for improving the production potential and nutrients digestibility in broilers. One hundred and twenty day old broiler chicks were randomly divided into 12 replicates of 10 birds each for the allotment to a control A and 3 treatment groups B, C and D. All four groups A, B, C and D were fed with starter up to four weeks and finisher ration from 5th to 7th weeks of age supplemented with 0, 1, 2, 3% EM4, respectively. The supplementation of biofeed (EM4) in broiler ration (0-7 weeks) revealed non-significant ($p<0.05$) difference among the treatment groups in terms of growth rate, feed consumption and feed conversion efficiency. A non significant difference was observed in experimental birds fed with ration supplemented with Biofeed (EM4) in terms of bone meat ratio while a significant ($p<0.05$) difference was found in gut weight with highest weight in group A (3.75 g) followed by in C (2.98 g), D (2.90 g) and B (2.84 g). Difference in dry matter was found non-significant in all groups supplemented with different level of Biofeed (EM4).

Key words: Broilers, biofeed (EM4), protein

INTRODUCTION

Protein plays a significant role in perfect diet. Plants and animals are two main origins for protein. Pakistan is one of the countries that are deficient in animal origin protein and 66% people are lacked in protein in their daily food. Level of protein gets deceased day by day as compared to increase in human growth (Rehman *et al*., 2012). The poultry could prove a viable and quick source to meet the animal protein shortage because of its rapid growth and short generation interval (Maqbool *et al*., 2007). The growth is needed as maximum as in the minimum period of rearing and needed to be economical and efficient. Such an achievement can be obtained either by making least cost ration formulation on one hand or on other by incorporation of feed additives and growth promoters in the poultry rations. Different types of probiotics have been used to exploit the production potential of broiler birds (Mátéová *et al*., 2009). Microbial cultures regulate the microbial environment of the intestine, decrease digestive disturbances, inhibit intestinal pathogenic micro-organisms and improve feed conversion efficiency (Venugopalan *et al*., 2010). It is investigated that the use of biofeed in poultry may prove beneficial to increase the nutrient availability in their gut and reduction in infectious illnesses (Lamprecht *et al*., 2012). Therefore current project has been designed to investigate the effectiveness of biofeed (EM4) in poultry for improving the production potential and nutrients digestibility in broilers.

MATERIALS AND METHODS

Performance trail: One hundred and twenty day old broiler chicks were randomly divided into 12 replicates of 10 birds each for the allotment to a control A and 3 treatment groups B, C and D. The experimental birds were maintained on deep litter in 3'x4' pens. Each pen was covered with a wire netting and all drinkers, feeders and utensils were disinfected with disinfectant. The chicks were brooded at 95°F during first week and thereafter, the temperature was reduced by 5°F every week until it reached 70°F. During the starter phase (0-4 weeks) a commercial broiler starter ration having 22% C.P supplemented with 0, 1, 2 and 3% biofeed (EM4) was fed. While in finisher phase commercial broiler finisher ration having 19.68% C.P containing same levels of biofeed was fed to the broiler chicks from 5th to 7th weeks of age. Group A served as control and was given ration without biofeed (EM4), while groups B, C and D were fed ration containing 0, 1, 2 and 3% biofeed, respectively. Biofeed (EM4) was mixed with broiler ration on daily basis and offered to birds twice a day. Weekly body weight, feed consumption, feed conversion ratio data was recorded and dressing percentage of two birds from each replicate were calculated at the end of complete trail. Bone meat ratio of each bird was also calculated through biology of carcass for 10 to 20 min at 100°C and after separation of bone and meat, individual weight was estimated. Mortality records on daily basis were also maintained in order to calculate mortality percentage in treatment group.

Corresponding Author: Z.I. Chauhan, Department of Livestock and Dairy Development, Punjab, Pakistan

Digestibility trail: A separate group of 35 broilers chicks was maintained for four weeks. At day 29th all the chicks were weighed individually and twelve chicks of similar body weight (800-850 g) were selected and randomly transferred to individual metabolic cages to be used for digestibility trail. These birds were allocated randomly to each treatment (3 birds/treatment). They were given equal amount of feed for seven days as an adaptation period. After adaptation period collection trays were put under each cage and the droppings of the birds were collected for 48 hours at two hours interval and analyzed for moisture contents, crude protein and crude fiber using proximate analysis technique (A.O.A.C, 2010).

Statistical analysis: The data collected was analyzed by analysis of variance (ANOVA) using completely randomized design (CRD) to detect the difference between treatments and the means were compared by using Duncan's Multiple Range test (DMR).

RESULTS AND DISCUSSION

Weight gain: The average total weight gain values during the starter phase (0-4 weeks) were 779±39.9, 775±7.83, 819±19.1 and 814±8.45 g in birds reared on ration A, B, C and D, respectively as shown in Table 1. Weight gained due to 2 and 3 percent Biofeed (EM4) were higher as compared to control group and ration containing 1% EM4 but statistically a non-significant ($p<0.05$) difference among weight gains was found. On the other hand birds reared on finisher from 5-7 weeks of age obtained average total weight 885±14.8, 960±10.8, 957±12.6 and 789±85.2 with non-significant difference ($p<0.05$) in group A, B, C and D containing 0, 1, 2 and 3 percent EM4. The results of this study are in accordance with Chawla *et al.* (2013), Fatufe and Matanmi (2008) and Arslan (2009) who supplemented microbial culture of *Enterococcus* spp in broiler feed ration and reported non-significant difference in terms of weight gain. Non-significant difference in body weight as compared to control group in initial 28 days was also encountered by Kral *et al.* (2012). Stavric and Kornegay (1995) stated that some results showed the beneficiary effects of probiotics on weight gain, egg production and efficiency of feed of poultry but generally results were contradictory.

Feed consumption: Birds in group A, B, C and D consumed starter feed containing 0, 1, 2 and 3% EM4 with total Mean+SD of 1444±39.9, 1342±64.7, 1414±11.8 and 1457±22.0 g as shown in Table 1. In group D higher feed was consumed as compared to other groups but statistically non-significant ($p<0.05$) difference was observed in all groups regarding feed consumption. A non-significant ($p<0.05$) difference was monitored during rearing birds from 5th to 7th weeks of age on finisher ration in group A, B, C and D with total Mean±SD of 4021±65.8, 3916±94.8, 4163±17.9 and 4130±68.3 g, respectively. Findings of Ayasan *et al.* (2005) also support the results of present study and concluded that after six weeks probiotics (Yucca schidigera) of 120 ppm in poultry feed did not significantly affect feed intake. Study of Rahman *et al.* (2009) showed that probiotics mixed feed increased feed consumption significantly. Non-significant increase in feed intake may depends on origin of feed, type of probiotics, concentration of probiotics, condition of climate, route of administration and the way in which probiotics are mixed that may be in water or in feed (Hamid *et al.*, 1994; Samanta and Biswas, 1997; Bedford, 2001).

Feed conversion ratio: Non-significant ($p<0.05$) difference was found in feed conversion ratio with Mean±SD in group A was 2.91±0.0844 followed by B (2.68±0.057), C (2.87±0.0490) and D (3.47±0.407) as shown in Table 1. The average feed conversion ratio values of the birds on treatment A, B, C and D on finisher ration from 5th to 7th weeks of age were 2.41±0.0292, 2.25±0.0346, 2.34±0.0348 and 2.59±0.133, respectively as shown in Table 2. Feed conversion ratio was lower as compared to control in 1st phase that may be due to production of enzymes synthesized by probiotics which improved feed conversion rate and similar findings were consensus with results of Samad *et al.* (2011). Overall non-significant difference in FCR of present study got similarity with findings of Chawla *et al.* (2013) and Fatufe and Matanmi (2008).

Digestibility trail: Apparent digestibility of dry matter of broilers under treatment with starter ration supplemented with EM4 microbial culture was examined and were found with non-significant different average values of 61.15±0.097, 61.02±0.615, 64.44±4.18 and 61.05±2.49 percent in group A, B, C and D, respectively as shown in Table 3. Similar findings were observed by Wang *et al.* (2008) with no significant difference. There was a non-significant difference in digestibility of crude fibers of broilers in group A (42.65±1.69), B (40.49±1.07), C (40.07±6.03) and D (39.42±3.47) as shown in Table 3. A non-significant difference was counted in digestibility of crude protein in group A, B, C and D with total Mean±SD of 85.4±0.213, 86.23±0.491, 89.30±2.01 and 85.56±1.56, respectively as illustrated in Table 3.

Bone meat ratio: The average bone meat ratio values of the birds at seven weeks of age were found to be 1:2.45±0.058, 1:2.54±0.113, 1:2.59±0.05 and 1:2.46±0.107 in groups A, B, C and D, respectively as shown in Table 4. Slightly higher bone meat ratio values were recorded in group B and C containing 1% and 2% biofeed as compared to group A and D containing 0%

Table 1: Meat value of weight gain, feed consumption and feed efficiency in broiler chicks given biofeed (EM4) through boiler starter ration during 0-4 weeks

	Temperature			
Description	A (0%)	B (1%)	C (2%)	D (3%)
Weight gain (g)	770±39.9	775±7.83	819±19.1	814±8.45
Feed consumption (g)	1444±21.7	1342±64.7	1414±11.8	1457±22.0
Feed conversion ratio (g feed/g gain)	1.86±0.0705	1.73±0.0833	1.72±0.285	1.78±0.0315

Table 2: Mean values of weight gain feed consumption and feed efficiency in broiler chicks given biofeed (EM4) through boiler finisher ration during 5-7 weeks

	Temperature			
Description	A (0%)	B (1%)	C (2%)	D (3%)
Weight gain (g)	885±14.8	960±10.8	957±12.6	789±85.2
Feed consumption (g)	2577±54.7	2574±83.3	2749±10.0	2673±59.1
Feed conversion ratio (g feed/g gain)	2.91±0.844	2,68±0.057	2.87±0.0490	3.47±0.407

Table 3: Meat value of weight gain, feed consumption and feed efficiency in broiler chicks given biofeed (EM4) during starter cum finisher phase 0-7 weeks

	Temperature			
Description	A (0%)	B (1%)	C (2%)	D (3%)
Weight gain (g)	1664±25.6	1735±18.6	1776±25.2	1603±86.8
Feed consumption (g)	4021±65.8	3916±94.8	4163±17.9	4130±68.3
Feed conversion ratio (g feed/g gain)	2.41±0.0293	2.25±0.0348	2.34±0.0348	2.59±0.133

Table 4: Mean value of percent apparent digestibility of dry matter, crude protein and crude fibre in broiler chicks given Biofeed (EM4) in the ration

	Temperature			
Description	A (0%)	B (1%)	C (2%)	D (3%)
Dry matter	61.15±.097	61.02±0.615	64.44±4.18	61.95±2.49
Crude fiber	42.65±1.69	40.49±1.07	40.07±6.03	39.42±3.47
Crude protein	85.4±0.213	86.23±0.419	89.30±2.01	85.56±1.56

and 4% biofeed. Kabir *et al*. (2004) emphasized that probiotics got significantly ($p<0.01$) increased in total live weight gain and approximately parallel results were observed at all level of rearing. Results of Kalavathy *et al*. (2003), Islam *et al*. (2004) and Ashayerizadeh *et al*. (2009) showed similar impact of probiotics on live weight gain.

Gut weight: Significant difference ($p<0.05$) in relative gut weight (g/100 g body weight) was counted as 3.75±0.12, 2.84±0.03, 2.90±0.29 and 2.98±0.01 in group A, B, C and D, respectively. Results of Awad *et al*. (2009) were similar to current results who stated that gut weight of poultry got increased in either case of probiotics (3.17) or symbiotic (3.11) as compared to control (2.89).

REFERENCES

Arslan, C., 2009. Effect of dietary probiotic supplementation on growth performance in the rock partridge (Alectoris graeca). Turk. J. Vet. Anim. Sci., 28: 887-891.

Ashayerizadeh, A., N. Dabiri, O. Ashayerizadeh, K. Mirzadeh, H. Roshanfekr and M. Mamooee, 2009. Effect of dietary antibiotic, probiotic and prebiotic as growth promoters, on growth performance, carcass characteristics and hematological indices of broiler schickens. Pak. J. Biolog. Sci., 12: 52-57.

Awad, W., K. Ghareeb, S. Abdel-Raheem and J. Böhm, 2009. Effects of dietary inclusion of probiotic and synbiotic on growth performance, organ weights and intestinal histomorphology of broiler chickens. Poult. Sci., 88: 49-56.

Ayasan, T., S. Yurtseven, M. Baylan and S. Canogullari, 2005. The effects of dietary Yucca schidigera on egg yield parameters and egg shell quality of laying Japanese quails (Coturnix coturnix japonica). Int. J. Poult. Sci., 4: 159-162.

AOAC, 2010. (Association of Official Analytical Chemists). Official Methods of Analysis of Official Analytical Chemists International, 16th ed. Association of Official Analytical Chemists, Arlington, VA.

Bedford, M. and J. Apajalahti, 2001. Microbial interactions in the response to exogenous enzyme utilization. Enzymes in farm animal nutrition. CABI Publ., 299-314.

Chawla, S., S. Katoch, K. Sharma and V. Sharma, 2013. Biological response of broiler supplemented with varying dose of direct fed microbial. Vet. World, 6.

Fatufe, A. and O. Matanmi, 2008. The effect of probiotics supplementation on the growth performance of two strains of cockerels. J. Cent. Eur. Agri., 9.

Hamid, A., Z. Khan, A. Munid and M. Qadeer, 1994. Probiotics in poultry production. Bangl. J. Sci. Ind. Res., 29: 1-12.

Islam, M., M. Rahman, S. Kabir, S. Kamruzzaman and M. Islam, 2004. Effects of probiotics supplementation on growth performance and certain haemato-biochemical parameters in broiler chickens. Bangl. J. Vet. Med., 2: 39-43.

Kabir, S.L., M. Rahman, M. Rahman and S. Ahmed, 2004. The dynamics of probiotics on growth performance and immune response in broilers. Int. J. Poult. Sci., 3: 361-364.

Kalavathy, R., N. Abdullah, S. Jalaludin and Y. Ho, 2003. Effects of Lactobacillus cultures on growth performance, abdominal fat deposition, serum lipids and weight of organs of broiler chickens. Br. Poult. Sci., 44: 139-144.

Kral, M., M. Angelovicova and L. Mrazova, 2012. Application of probiotics in poultry production. Sci. Papers Anim. Sci. and Biotechnol., 45: 55-57.

Lamprecht, M., S. Bogner, G. Schippinger, K. Steinbauer, F. Fankhauser, S. Hallstroem, B. Schuetz and J.F. Greilberger, 2012. Probiotic supplementation affects markers of intestinal barrier, oxidation and inflammation in trained men; a randomized, double-blinded, placebo-controlled trial. J. Int. Soc. Sports Nutr., 9: 45.

Mátéová, S., M. Gaálová, J. Šály and M. Fialkovièová, 2009. Investigation of the effect of probiotics and potentiated probiotics on productivity of laying hens. Czech J. Anim. Sci., 54: 24-30.

Maqbool, A., K. Abdullah and K. Bukhsh, 2007. Issues and economics of poultry production: a case study of Faisalabad, Pakistan. Pak. Vet. J., 27: 25-28.

Rahman, A., K. Sarzamin, K. Daulat, N. Hussain, A. Sohail, S.M. Sohail, A. Ishtiaq, I. Haq and S. Zahir, 2009. Use of probiotics in broiler feed at starter phase. Sarhad J. Agric., 25.

Rehman K., S. Andleeb, A. Mahmood, S. Bukhar, M.M. Naeem and K. Yousaf, 2012. Translocation of Zinc and Nickel from Poultry ed to Broilers and Their Excretion Through Litters. Global Veterinaria 8: 660-664.

Samad, G., N. Kambiz, M. Naser, A. Saeed, M.A. Afshar, M. Masoud and A.S. Seyed, 2011. Effects of lactobacillus-based probiotic on growth performance, mortality rate and carcass yield in broiler chickens. Annals Bio. Res., 2: 325-131.

Samanta, M. and P. Biswas, 1997. Effect of feeding Streptococcus culture on the performance of broilers. J. Int., 1: 118-120.

Stavric, S. and E.T. Kornegay, 1995. Microbial probiotics for pigs and poultry. Biotechnol. in Anim. Feeds and Anim. Feeding, 205-231.

Venugopalan, V., K.A. Shriner and A. Wong-Beringer, 2010. Regulatory oversight and safety of probiotic use. Emerging Infect. Dis., 16: 1661.

Wang YJ., D. Cang, L. Zhou and Y. Dong, 2008. Heavy metals pollution in poultry and livestock feeds poultry and manures under intensive farming in Jiangsu Province. J. Environ Sci., 16(3): 371-374.