

INFLUENCE OF PROBIOTICS SUPPLEMENTATION ON PERFORMANCE OF BROILERS

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1. ABSTRACT

An experiment was conducted to study the effect of probiotics supplementation on performance of broilers in terms of body weight, feed intake and feed efficiency. Forty two Vencobb broiler straight run chicks were wing banded, weighed individually and distributed randomly in to two experimental diets with and without supplementation of probiotics. The probiotic contained *Lactobacillus species*. The birds were housed in deep litter pens and reared from day one to six weeks following uniform standard managerial practices. Feed intake was recorded daily, body weight was taken at weekly intervals and weight gain and feed efficiency worked out for 0-6 weeks. The weight gain was significantly ($p<0.05$) increased by 5.8 % in probiotic supplemented groups than without supplemented group. The feed intake was not affected by probiotic supplementation. However it was numerically decreased in probiotic supplemented group when compared to control. Mean feed efficiency was significantly ($p<0.05$) better in probiotic supplemented group than control. The improvement in feed efficiency was 8.8% in probiotic supplemented group when compared to control. It was concluded that the probiotic supplementation was significantly increased weight gain and feed efficiency in broilers.

Key words: probiotic, broilers, feed intake, weight gain, feed efficiency

2. INTRODUCTION

The extensive use of antibiotics in poultry industry was to promote growth rate, increasing feed efficiency and prevention of intestinal infections had led to the development of antibiotic resistant bacteria in the gastrointestinal tract and drug residuals in meat. The antibiotic residue in meat will affects the human health; hence some countries banned certain antibiotics being frequently included in the rations as growth promoters for poultry. Thus, a product alternative to antibiotics and maintain good health, improving weight gain and feed conversion ratio in broilers without any residue in the meat is highly desirable in broiler production. Probiotics are the live microbial feed supplement that exhibits a beneficial effect on the health of the host when they are ingested (Salminen *et al.*, 1998). It effects like improved growth rate and feed utilization, preventing colonization of harmful microorganisms in intestine, neutralization of enterotoxins produced by pathogens, anti tumoral/anti carcinogenic effect, anti-cholesterolamic effect and immunity inducer etc.,. The inclusion of probiotics to poultry's diet results in a significant improvement in weight and feed efficiency (Khaksefidi and Rahimi, 2005; Mountzouris *et al.*, 2010). *Salmonella* and *campylobacter* have often been considered responsible for gastroenteritis in poultry have often been implicated as source for human infections. Intestinal colonization of *salmonella*, *campylobacter* and *coliforms* in the chickens play a role in carcasses contamination at slaughter, thus, reducing *salmonella*, *campylobacter* and *coliforms* colonization in chickens may potentially reduce incidence of infections in humans. Earlier research on probiotics reduces the pathogenic bacteria in intestine by modulaing the intestinal microflora (Higgins *et al.*, 2007). Hence the present study was conducted to study the effect of probiotic feeding on performance of broilers in terms of body weight, feed intake and feed efficiency for 0-6 weeks.

3. MATERIALS AND METHODS

Feed ingredients procured locally, were used for the formulation of diet. Two experimental starter and finisher diets were formulated (BIS, 1992) to contain with and without supplementation of probiotics. The ingredient and chemical composition (AOAC, 1990) of the broiler starter and finisher feeds are presented in Table 1.

Table 1: Ingredient and chemical composition of broiler starter and finisher diets

Ingredients (%)	Broiler starter	Broiler finisher
Maize	44	47.50
Broken rice	2.2	4.80
Cumbu	2.8	3.50
Deoiled rice bran	1.1	2.60
Sunflower meal	0.5	0.50
Deoiled groundnut cake	8.0	3.80
Soya bean oil cake	37.8	32.70
Calcite	1.45	1.35
Dicalcium phosphate	1.65	1.75
Oil	0.5	1.50
Chemical composition (%)		
Dry matter	91.69	90.44
Crude protein	22.99	20.07
Crude fibre	4.86	4.83
Ether extract	2.95	3.93
Total ash	9.13	9.31
NFE *	60.07	61.86
Acid insoluble ash	1.96	2.06
Calcium	1.14	1.05
Phosphorus	0.67	0.67
Available Phosphorus*	0.45	0.45
ME(kcal/kg)*	2799	2904

- Mineral mixture 1g per kg feed added and contained calcium-32%, phosphorus-6%, manganese-0.27%, iodine-0.01%, zinc-0.26%, copper-100ppm and iron-1000ppm
- Vitamin AB₂D₃K 0.2g per kg feed added and supplied vitamin A-8250 IU, B₂-5 mg, D₃ 1200 IU and vitamin-K 1 mg.
- Probiotics containing *Lactobacillus acidophilus*, *Lactobacillus casei* and *Lactobacillus reuterii* (2 x 10⁹ CFU/g) added at a level of 0.01% in the diet

* Calculated values

Forty two Vencobb broiler straight run chicks belonging to a single hatch were wing banded, weighed individually and distributed randomly to two experimental diets with three replicates of seven chicks each with and without supplementation of probiotics containing *Lactobacillus acidophilus*, *Lactobacillus casei* and *Lactobacillus reuterii* (2×10^9 CFU/g) at a level of 0.01% in the diet.

The birds were housed in deep litter pens and reared from day one to six weeks following uniform standard managemental practices. The chicks were fed with weighed quantity of experimental diets and they had free access to water. Feed intake was recorded daily, body weight was taken at weekly intervals and weight gain and feed efficiency were worked out. Mortality, if any, was recorded. The data collected on various parameters were statistically analyzed as per the method of Snedecor and Cochran (1989).

4. RESULTS AND DISCUSSION

The data on weight gain, feed intake and feed efficiency of broilers fed with and without supplementation of probiotics are presented in **Table 2**.

The mean weight gain of birds fed with the diets containing probiotics and without probiotics were 1587.33 and 1495.33 g/bird respectively. There was a significant ($P < 0.05$) increase in weight gain was observed in probiotic supplemented birds. The increase in weight gain was 5.8 % than control. The present result was in agreement with many investigators (Sahin *et al.*, 2009; Ashayerizadeh *et al.*, 2009) who demonstrated increased live weight gain in probiotic fed birds. Similarly, Ignatova *et al.* (2009) also reported that probiotics supplementation improved the body weight ($P < 0.01$) by 14.1% than control. Further, Mountzouris *et al.* (2010) reported that the inclusion of probiotics had a significant effect on broiler growth performances when compared to control.

Table 2. Effect of probiotic supplementation on weight gain, feed intake and feed efficiency of broilers (Mean[#] ± SE)

Parameters	Without probiotic supplementation	With probiotic supplementation
Initial body weight (g/bird) ^{NS}	35.27 ± 0.50	35.23 ± 0.41
Final body weight (g/bird)*	1530.60 ± 23.09 ^a	1622.56 ± 20.48 ^b
Weight gain (g/bird)*	1495.33 ± 22.73 ^a	1587.33 ± 20.17 ^b
Feed intake (g/bird) ^{NS}	3057.67 ± 36.29	2947.67 ± 37.83
Feed efficiency *	2.04 ± 0.02 ^a	1.86 ± 0.05 ^b

[#]Mean of three observations;

*Means in the same row with different superscripts differ significantly (P<0.05),

^{NS} Not significant

The mean feed intake of the broilers fed with the diet containing probiotics was 2947.67 g/bird and without probiotics was 3057.67 g/bird respectively. Significant difference was not observed in feed intake. However the feed intake was marginally decreased in probiotics supplemented groups than control. Similarly Yu *et al.* (2007) observed that the supplementation of dried *Lactobacillus reuteri* Pg4 strain probiotics decreased the feed intake significantly than control. This was inconsistent with earlier report by Ignatova *et al.* (2009) who was reported that the probiotics significantly (P<0.05) increased the feed intake by 7.7 % when compared to control. Similarly Shareef and Al-Dabbagh (2009) also reported that the probiotics increased the feed intake significantly (P<0.05) than other birds.

The mean feed efficiency of birds fed with the diets containing probiotics and without probiotics was 1.86 and 2.04 respectively. Mean feed efficiency was significantly (P<0.05) better in probiotic supplemented group than control. The improvement in feed efficiency was 8.8% in probiotic supplemented group when compared to control. Yu *et al.* (2007) observed that the supplementation of dried *Lactobacillus reuteri* Pg4 strain probiotics improved significantly the

feed conversion by 5 % in a 0-6 weeks feeding period compared with the control group. Similarly there was a significant improvement in feed efficiency was observed in probiotic supplemented birds by 8.1 % than control (Ignatova *et al.*, 2009). Shareef and Al-Dabbagh (2009) also reported that the birds also had a significantly ($P<0.05$) better feed conversion ratio than others. Further, Mountzouris *et al.* (2010) also reported that the inclusion of probiotics had a significant effect on broiler growth performances when compared to control. The improvement in weight gain and feed efficiency might be due to the effects of probiotics on preventing colonization of harmful micro organisms in intestine and neutralization of entero toxins which intern to increase the nutrient utilization and better performance.

It was concluded that the probiotics supplementation significantly increased the weight gain and better feed efficiency of broiler chicken from 0- 6 weeks.

5. REFERENCES

- AOAC, 1990. Official Methods of Analysis, Association of Official Analytical Chemists, 15thedn., Washington, D.C.
- Ashayerizadeh, A., N.Dabiri, O. Ashayerizadeh, K.H. Mirzadeh, H. Roshanfekar, M. Mamooee, 2009. Effect of dietary antibiotic, probiotic and prebiotic as growth promoters, on growth performance, carcass characteristics and hematological indices of broiler chickens. *Pakis. J. Biol.Sci.* 12, 52-57
- BIS.1992, Requirement chicken feeds. IS:1374-1992, Menak Bhavan, 9 Bahadurshah Zafar Marg, New Delhi-110001.
- Higgins, J.P., S.E.Higgins, J.L. Vicente, A.D. Wolfenden, G.Tellez, B.M.Hargis, 2007. Temporal effects of lactic acid bacteria probiotic culture on *Salmonella* in neonatal broilers. *Poult. Sci.* 86, 1662-1666.
- Ignatova, M, V. Sredkova, V. Marasheva, 2009. Effect of dietary inclusion of probiotic on chickens performance and some blood indices. *Biotechnology in Animal Husbandry* 25 (5-6): 1079-1085
- Khaksefidi, A., and Sh. Rahimi, 2005. Effect of Probiotic Inclusion in the Diet of Broiler Chickens on Performance, Feed Efficiency and Carcass Quality. *Asian-Aust. J. Anim. Sci.* 18 (8) : 1153-1156

- Mountzouris, K. C., P. Tsitsrikos , I. Palamidi ,A. Arvaniti , M. Mohnl, G. Schatzmayr, and K. Fegeros, 2010. Effects of probiotic inclusion levels in broiler nutrition on growth performance, nutrient digestibility, plasma immunoglobulins, and cecal microflora composition 1. *Poultry Science*. 89:58–67
- Sahin, E.H and M. Yardimci, 2009. Effects of kefir as a probiotic on growth performance and carcass characteristics in geese (*Anser anser*). *J. Anim. Vet. Adv.* 8, 562-567.
- Salminen, S., A. von Wright, L. Morelli, P. Martean, D. Brassart, W. M. de Vos, R. Fonden and T. Matills-Sandholm. 1998. Demonstration of safety of probiotic-A Review. *Intl. J. Food Microbiol.* 44:93-106.
- Shareef, A. M. and A. S. A. Al-Dabbagh, 2009. Effect of probiotic (*Saccharomyces cerevisiae*) on performance of broiler Chicks. *Proceedings of the 5th Scientific Conference, College of Veterinary Medicine, University of Mosul, Iraqi Journal of Veterinary Sciences*, 23 (I):23-29
- Snedecor, G.W. and W.C. Cochran, 1989. *Statistical Methods* 8th edn. Iowa State University Press, Ames, Iowa.
- Yu, B., J. R. Liu, M. Y. Chiou, Y. R. Hsu and P. W. S. Chiou, 2007. The Effects of Probiotic *Lactobacillus reuteri* Pg4 Strain on Intestinal Characteristics and Performance in Broilers. *Asian-Aust. J. Anim. Sci.* 20(8) : 1243 - 1251