EFFECT OF FEEDING PROBIOTICS AND VIRGINIAMYCIN ON BODY WEIGHT GAIN OF BROILER CHICKS

S. Kumar, R.S. Choudhary, P.G. Gujrathi, D. Jain, T. Bothra, P.K. Yadav and R. Kumawat
Department of Livestock Production and Management, College of Veterinary and Animal Science
Rajasthan University of Veterinary and Animal Sciences, Bikaner-334 001, Rajasthan, India

Received Revised: 17.05.2016
Accepted: 17.06.2016

ABSTRACT

A total of 270 day-old broiler chicks of Cobb strain were randomly distributed into six treatment groups of 45 chicks with three replicates having 15 chicks each. They were fed probiotics @ 1 g/10 kg and virginiamycin @ 1 g/kg alone, and in all possible combinations at the same dose rate as the feed supplement up to 42 days of age to evaluate their effect on body weight gain. The various feed additives given to different experimental groups were T_1 (control), T_2 (virginiamycin), T_3 (probiotics), T_4 (virginiamycin and probiotics), T_5 (virginiamycin 0-3 weeks and probiotics 4-6 weeks) and T_6 (probiotics 0-3 weeks and virginiamycin 4-6 weeks). Results obtained at sixth week of age revealed highest mean body weight in group T_2 (1625.26 ± 46.98 g) followed by group T_4, T_3, T_6, T_1 and T_5 groups having mean body weight of (1610.81 ± 47.33 g), (1608.86 ± 48.09 g), (1603.33 ± 49.30 g), (1584.57 ± 47.52 g) and (1551.36 ± 47.52 g), respectively. Mean body weight of all the six groups did not differ significantly among themselves but feed additives as growth promoter improved the body weight of chicks as compared to the control group. The maximum cumulative mean body weight gain was found in T_2 group (1498.28 ± 45.70 g) and minimum cumulative mean body weight gain was observed in T_5 (1421.87 ± 46.23 g). Intermediate body weight gain were found in T_4 (1484.84 ± 46.25 g), T_3 (1481.70 ± 46.79 g), T_6 (1474.85 ± 47.96 g) and T_1 (1458.50 ± 46.24 g). The differences in the cumulative mean body weight gain of all the groups were found to be non-significant. The findings of present study suggest that group of chicks fed virginiamycin (T_2) attained numerically more body weight than control and other treatment groups.

***Key words*:** Body weight, probiotics, virginiamycin, broilers, body weight gain

Introduction

The poultry industry is one of the most important contributors for the growth of rural economy in our country. Recent trend in poultry development have revealed that this industry has a tremendous potential in improving the nutritional status of million of people.

Profit margin in poultry is greatly affected by its cost of production. Nutrition is far the most important factor which plays a significant role in broiler production by sharing about 70 to 75 per cent of total cost production. Rising prices of feed has certainly reduced the profitable nature of broiler farming. Hence, economic poultry farming is the need of the hour. In this regard efforts have been made to minimize the input costs by the use of feed additives (Swain and Johri, 2000).

Feed additives are commonly described as non-nutrient substances that accelerate growth, efficiency of feed utilization, or beneficial for health or metabolism of the animals (Church and Pond, 1988). The additives that hold great promise in the feeding of poultry comprise of antibiotics, coccidiostats, antioxidants, enzymes, hormones, probiotics, buffers, organic acids, mould inhibitors, herbal products, synthetic micronutrients etc.

A probiotic, by the generally accepted definition, is defined as a live microbial supplement, which beneficially affects the host animal by improving its intestinal microbial balance (Fuller, 1989). Probiotic is a culture of specific live micro-organisms primarily lactobacillus species. During the last few years the research workers have documented the results of incorporating probiotics into poultry diets and have found variable results.

Virginiamycin used as feed additive antibiotic, is non-therapeutic and not absorbed from gastro intestinal tract. This additive do not act directly on chicken, rather produce favourable effect on growth rate, feed efficiency and mortality by inhibiting undesirable micro-organisms in the digestive tract. Enhanced utilization of sulphur amino-acid, phosphorus and manganese has also been reported for birds consuming virginiamycin (Belay and Teeter, 1994). In poultry industry, a 3-5 per cent increase in growth and feed conversion efficiency is a typical effect of antibiotics used in feed at prophylactic levels (Thomke and Elwinger, 1998).

Hence, the present experiment has been designed to study the effect of supplementation of different feed additives in broiler ration on the performance of broiler chicks.

Materials and Methods

A total of 270 day-old straight run broiler chicks of Cobb strain were used for the experiment. These chicks were randomly divided in to six treatment groups of 45 chicks and each group was further divided in to three replicates having 15 chicks each. The chicks were reared under identical standard managemental practices like brooding, feeding, watering, lighting, health care etc. The birds were offered basal diet both starter ration for 0-3 weeks and finisher ration for 4-6 weeks. The first feeding group (T_1) was kept as the control and no additive was supplemented to the starter and basal ration. The second group (T_2) virginiamycin @ 1 g/kg feed (0.002 per cent); the third group (T_3) probiotics @ 1 g/10 kg feed; the fourth group (T_4) a combination of virginiamycin and probiotics was incorporated with ration at the same rates as in treatment groups alone; the fifth group (T_5) virginiamycin 0 to 3 weeks and probiotics from 4 to 6 weeks; the sixth group (T_6) probiotics 0 to 3 weeks and virginiamycin from 4 to 6 weeks. Feed and fresh water were offered *ad libitum* to each group throughout

Table 1: Composition of basal ration fed to the chicks

Ingredient	Starter ration (parts per 100)	Finisher ration (parts per 100)
Maize	50	55
Rice polish	13	16
Soya DOC	25	20
Fish meal	10	07
Mineral mixture	02	02
Total	100	100
Calculated composition:		
Crude protein	22.26	19.76
Energy (Kcal/Kg)	2868.71	2941.62

Table 2: Least squares means with respective standard errors for body weight (g/chick) at different weeks

Treatment	←Age in weeks→						
	0 day	I	II	III	IV	V	VI
T_1	52.93 ±0.60	125.33 ±2.71	231.11 ±7.02	422.21 ±13.63	741.22 ±23.09	1135.18 ±33.87	1584.57 ±47.52
T_2	52.67 ±0.60	127.02 ±2.71	250.17 ±7.02	456.11 ±13.47	780.09 ±22.83	1192.76 ±33.48	1625.26 ±46.98
T_3	53.07 ±0.60	127.02 ±2.71	234.86 ±7.10	434.56 ±13.47	746.78 ±23.10	1142.38 ±33.88	1608.86 ±48.09
T_4	51.87 ±0.60	126.20 ±2.71	253.91 ±7.10	446.45 ±13.63	740.46 ±23.10	1150.86 ±33.88	1610.81 ±47.53
T_5	52.53 ±0.60	129.87 ±2.71	247.38 ±7.02	436.00 ±13.32	740.80 ±23.09	1116.94 ±33.87	1551.36 ±47.52
T_6	53.96 ±0.60	129.16 ±2.71	240.64 ±7.10	412.68 ±13.79	721.10 ±23.66	1141.32 ±35.14	1603.33 ±49.30

Table 3: Least squares means with respective standard errors for body weight gain (g/chick) at different weeks

Treatment	←Age in weeks→						
	I	II	III	IV	V	VI	0 -VI
T_1	72.40^{a} ±2.52	105.78^{a} ±5.12	189.32^{a} ±7.80	319.03^{a} ±12.28	393.92^{a} ±16.03	449.37^{a} ±18.81	1458.50^{a} ±46.24
T_2	74.36^{a} ±2.52	123.16^{b} ±5.12	205.94^{a} ±7.71	323.95^{a} ±12.14	412.71^{a} ±15.85	432.52^{a} ±18.60	1498.28^{a} ±45.70
T_3	74.40^{a} ±2.52	107.16^{a} ±5.18	199.71^{a} ±7.71	311.25^{a} ±12.29	395.69^{a} ±16.04	461.20^{a} ±19.04	1481.70^{a} ±46.79
T_4	74.33^{a} ±2.52	127.52^{b} ±5.18	192.92^{a} ±7.80	294.00^{a} ±12.29	410.22^{a} ±16.04	459.87^{a} ±18.82	1484.84^{a} ±46.25
T_5	77.33^{a} ±2.52	117.51^{ab} ±5.12	188.62^{a} ±7.62	307.51^{a} ±12.28	376.24^{a} ±16.04	434.46^{a} ±18.81	1421.87^{a} ±46.23
T_6	75.20^{a} ±2.52	112.14^{ab} ±5.18	171.70^{a} ±7.89	306.07^{a} ±12.59	407.54^{a} ±16.64	461.99^{a} ±19.51	1474.85^{a} ±47.96

Mean values in each column having same superscript do not differ significantly (P<0.05)

the experimental period.

1. Mineral mixture supplied: Each gram contained 3% moisture, 30% calcium, 9% phosphorus, 0.40% manganese, 0.01% iodine, 0.4% zinc, 0.05% fluorine, 500 ppm copper, 2000 ppm iron, 20% sodium chloride.
2. Vitamin premix supplied: The following: Vit. A, 500,000 I.U. Vit D_3, 100,000 I.U.; Vit B_2: 0.1 g; Vit E 75 I.U.; Vit. K 0.1 g; calcium pantothenate 0.25 g; nicotinamide 1.0 g; Vit. B_{12} 0.6 mg; choline chloride 15 g; calcium 75 mg; manganese 2.75 g; iodine 0.11 g; iron 0.75 g; zinc 12.5 g; copper 0.2 g; cobalt 0.045 g was added at the rate of 500 g in 100 kg of feed.

The various criteria fixed and the methods used for evaluating them are weekly body weight (g). Individual body weight of all the chicks was recorded on the day of their procurement and thereafter regularly at weekly interval up to six weeks of age. The weekly live weight gain was calculated from the difference in body weight attained at the end and at the start of the period. The data were subjected to statistical analysis mixed model least square and maximum likelihood computer programme PC-I version of Harvey (1987).

Results and Discussion

The results of six weeks study have been presented in Tables 2 and 3. The mean body weight was maximum influenced by the treatment group T_2 followed by T_4, T_3, T_6, T_1 and finally in T_5 group. The differences in mean body weight of chicks in different treatment group were found similar but feed additives as growth promoter improved the body weight of chicks as compared to the control group. Body weight gain revealed that the effect of various treatments was significant (P<0.05) in week II. During I, III, IV, V and VI weeks effect of treatment was insignificant. The maximum cumulative mean body weight gain was found in T_2 group (1498.28 ± 45.70 g) and minimum cumulative mean body weight gain was observed in T_5 (1421.87 ± 46.23 g). Intermediate body weight gain were found in T_4 (1484.84 ± 46.25 g), T_3 (1481.70 ± 46.79 g), T_6 (1474.85 ± 47.96 g) and T_1 (1458.50 ± 46.24 g). The overall effect of feed additives on cumulative weight gain (week I - VI) was also found to be non significant. In the present study, mean body weight and body weight gain was highest in group T_2 but there was no significant difference from the control group (T_1). Similarly body weight and body weight gain improved non significantly in groups T_4, T_3 and T_6 as compared to the control group. Similarly Dash *et al.* (1990); Khan (1997) and Iafigliola *et al*. (2000); Ahmadi (2011) recorded non significantly increased body weight gain of chicks fed virginiamycin in broiler ration. In the present study, the effect of probiotic on body weight and body weight gain was found to be non significant. However, the effect of probiotic on body weight and weight gain was more but not significant as compared to the control group (T_1). These findings are in accordance with Panda *et al*. (1999); Ladukar *et al*. (2001) and Hasan *et al*. (2007); Falaki *et al.* (2011) who observed no significant effect of probiotic on body weight.

References

Ahmadi, F. (2011) *Ann. Bio. Res.* **2** (5): 291-298

Belay, T. and Teeter, R.G. (1994) *J. Appl. Poult. Res*. **3**: 111-116.

Church, D.C. and Pond, W.G. (1988)*Basic animal nutrition and feeding.* 3rd ed. John Wiley & Sons, Toronto, pp. 267-275.

Dash, P.K. *et al.* (1990) *Response of broilers to certain performance promoters.*(Review from 13th Annual Poultry Conference and Symposium, Bombay Veterinary College, Parel, Bombay).

Falaki, M. *et al.* (2011) *J. Ani. Vet. Adv*. **10**(3): 378-384.

Fuller, R. (1989) *J. Appl. Bacteriol.* **66**: 365-378.

Harvey, W.R. (1987) *User's guide for LSMLMW PC-1 version mixed model least square and maximum likelihood programme*. IOWA, State University, IOWA, USA.

Hasan Ersin Samli, A. *et al.* (2007) *Archiv. Ani. Nutr.* **61** (1): 42-49.

Iafigliola, M.C. *et al.* (2000) *Rev. Bras. Cienc. Avic.* **2**(3): 201-208.

Khan, A. (1997) *Studies of the effect of some synthetic Vis-à-vis indigenous feed additives on the live performance and carcass yield of broilers*. M.V.Sc. Thesis submitted to Rajasthan Agricultural University, Bikaner.

Ladukar, M.D. *et al.* (2001) *Ind. J. Ani. Nutr*. **18**(4): 357-362.

Panda, A.K. *et al.* (1999) *Ind. J. Poultry Sci.* **34**(3): 343-346.

Swain, B.K. and Johri, T.S. (2000) *Ind. J. Poultry Sci*. **35**: 66-69.

Thomke, S. and Elwinger, K. (1998) *Annual Zootech.* **47**: 85-97.