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Effects of growth promoter and multivitamin-mineral premix supplementation on body weight gain in broiler chickens

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Abstract

An experiment was conducted at the Khanpura Poultry Farm, near to the Babugonj campus of Patuakhali Science and Technology University, Patuakhali during the period from August to September, 2011 to evaluate the effect of growth promoter and multivitamin-mineral premix on the body weight gain in broiler chickens. A total of 90 'Cobb 500' day-old broiler chickens were randomly divided into three equal groups (n = 30), namely Groups A, B and C. Broiler birds in groups A and B were supplemented with growth promoter and multivitamin-mineral premix, respectively in addition to commercial feed from day 4 till day 25. The dose of both the growth promoter and multivitamin-mineral premix was 2.5 g/kg of feed. Chickens of group C served as control and supplemented with commercial feed only. Body weight was recorded at three times as on day 11, 18 and 25, respectively. The mean body weight was insignificantly ($p > 0.05$) higher in birds of groups A (992.5 ± 139.6 g) and B (978.3 ± 147.0 g) than those of group C (926.7 ± 133.2 g). The percent increase in body weight gain compare to control was increased in both the supplemented groups (5.8% in group A and 8.8% in group B) though there was no significant difference. Based on the results, it is suggested that supplementation of growth promoter and multivitamin-mineral premix in broilers even after feeding of commercial feed has positive effect on the growth of broilers.

Keywords: Growth promoter, Multivitamin-mineral premix, Body weight gain, Broiler chickens

Introduction

Growth promoters and multivitamin-minerals have been used as premix in poultry feed, especially in broiler feed to improve the growth of broilers and the utilization of feed and thus realize better production and economic return. Growth promoters include some antibiotics (bacitracin methylene disalicylate or virginiamycin etc), vitamins, minerals, amino acids and some herbal drugs and they perform best when birds are in poor health (Prescott and Baggot, 1993; Peric *et al.*, 2009). Growth promoters are getting popularity as feed additives due to their beneficial effect on gut health and immunity, and growth performance (Panda *et al.*, 2009). Though, their mechanism of action varies, positive effect can be expressed through better appetite, improved feed conversion, stimulation of the immune system and increased vitality and regulation of the intestinal microflora (Peric *et al.*, 2009). Almost all vitamins with the exception of vitamin C are dietary essentials for poultry (Saif *et al.*, 2008). They have positive effect on the growth performance of chickens in terms of improving feed utilization and metabolism, stimulating the immune system and minimizing many stresses (Sahin *et al.*, 2003). Chickens are more susceptible to vitamin deficiency because gut flora can synthesize very little amount of vitamins, and therefore complete absence of dietary vitamins in chickens kept intensively undergoes many stresses (Ward, 1996). Further, it has been observed that anorexia, cessation of growth, drowsiness, weakness, incoordination, ruffled feathers, ataxia, blindness and xerophthalmia are common in vitamin A deficiency (West *et al.*, 1992). The appetite, metabolism, growth and production of poultry are greatly affected by the deficiency of almost all the B-complex vitamins (Saif *et al.*, 2008). Alongside with vitamins, deficiency of minerals such as selenium, copper, zinc and iron have been shown to affect the immune system of birds (Dardenne *et al.*, 1985; Suttle and Jones, 1989; Macpherson, 1994). Therefore, addition of multivitamin-mineral premix and growth promoter to poultry ration is considered to be a good assurance to improve growth and production of poultry and protect them from deficiency diseases (Saif *et al.*, 2008). In Bangladesh, the commercial broiler raisers mostly use commercial readymade feed. In addition, they randomly use growth promoters and multivitamin-mineral premix to have better growth of their broiler chickens. The commercial

broiler feed producers add vitamins-minerals and growth promoters in required amount to feed during manufacturing. Therefore, the usefulness of supplementation of vitamin-mineral premix and growth promoter in addition to commercial broiler feed in broilers is yet to be investigated. The present study demonstrates the effects of growth promoter and multivitamin-mineral premix supplementation on the body weight gain in broilers.

Materials and Methods

The experiment was conducted at Khanpura Poultry Farm, near to the Babugonj campus of Patuakhali Science and Technology University, Patuakhali during the period from August to September, 2011. A total of 90 'Cobb 500' day-old broiler chickens were randomly divided into three equal groups (n = 30), namely Groups A, B and C. In addition to commercial feed and supply of fresh tube well water *ad libitum*, chickens of Groups A and B were supplemented with growth promoter and multivitamin-mineral premix, respectively from day 4 till day 25 while Group C served as control (fed with commercial feed only). The growth promoter was a feed premix composed of vitamins, minerals and amino acids. The dose of both the growth promoter and multivitamin-mineral premix was 2.5g/kg feed. Chickens of all the groups maintained on cemented floor with rice husk as bedding and proper hygienic management practices. Routine vaccination was done against Newcastle disease and infectious bursal disease. Body weight was recorded at three times as on day 11, 18 and 25, respectively.

One-way ANOVA was done to find out the significant variation in body weight gain among different treatment groups by using SPSS 17.0.

Results and Discussion

The mean body weight of different groups of broiler at day 11, 18 and 25 is presented in Table 1. The mean body weight of birds in group A, which supplemented with growth promoter were 368.2±10.6g, 640.7±61.9g and 992.5±139.6g at day 11, 18 and 25, respectively. In case of group B that was supplemented with multivitamin-mineral premix, the mean body weight was 356.5±9.5g, 623.6±71.8g and 978.3±147.0g at day 11, 18 and 25, respectively.

Table 1. The mean body weight of broiler chickens supplemented with growth promoter and multivitamin-mineral premix

Groups (n = 30)	Body weight (g/bird) (Mean ± SD)		
	Day 11	Day 18	Day 25
Group A (Growth promoter)	368.2 ±10.6a	640.7±61.9a	992.5±139.6a
Group B (Multivitamin-mineral premix)	356.5±9.5a	623.6±71.8a	978.3 ±147.0a
Group C (Commercial feed only)	356.0±10.5b	610.4±47.9a	926.7±133.2a

n = Number of broiler chickens in each group.

Values with different letters within the same column differ significantly (p<0.001).

It is revealed that the increased mean body weight was recorded in birds of groups A (992.5±139.6g) and B (978.3±147.0g) than that of group C (926.7±133.2g). However this increase was not statistically significant. Earlier reports suggested that weight gain and feed efficiency significantly increase with the supplementation of vitamin-mineral premix (Ferket and Qureshi, 1992; Christmas *et al.*, 1995; Islam *et al.*, 2004; Paul *et al.*, 2010). It is explained that the supplementation of vitamin-minerals may enhance the absorption of nutrients and/or utilization of feed (Deyhim *et al.*, 1995).

To determine the exact increase in body weight gain between supplemented and non-supplemented groups, percent body weight gain was calculated (Table 2). After 25 days of experiment, the final mean body weight gain (g/bird) in groups A, B and C were 624.4, 621.9 and 570.7, respectively. Therefore, the percent body weight in those groups were 169.6%, 174.5% and 160.3%, respectively.

Table 2. The total body weight gain of broiler chickens supplemented with growth promoter and multivitamin-mineral premix

Groups (n = 30)	Mean initial body weight (g/bird) at day 11	Mean final body weight (g/bird) at day 25	Mean body weight gain (g/bird)	Percent body weight gain	% increase in body weight gain [#]
Group A (Growth promoter)	368.2	992.5	624.4	169.6	5.8
Group B (Multivitamin- mineral premix)	356.5	978.3	621.9	174.5	8.8
Group C (Commercial feed only)	356.0	926.7	570.7	160.3	-

n = Number of broiler chickens in each group.

[#] % increase in body weight gain relative to control group.

Increase in percent body weight gain in Groups A and B compared to that of control were 5.8% and 8.8%, respectively suggesting that percent increase in body weight gain in groups A and B might be due to supplementation of growth promoter and multivitamin-mineral premix in those particular groups. The increased weight gain is resembled to the previous reports of Deyhim *et al.* (1995) and Gavrilona *et al.* (1989) who reported that the addition of vitamin-minerals to basal diet increased the growth of broiler chickens by 3 to 12%.

All the broiler chickens have feed with commercial feed from a reputed feed company. Therefore, it may be concluded that supplementation of vitamin-minerals premix and growth promoters in broilers even after feeding of commercial feed has positive effect on the growth of broilers. However, it would be worthy if we could do further necessary analysis of micronutrients of the feed.

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