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# Effect of Feeding Probiotic, Prebiotic and Their Combination on Growth Performance of Broilers

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**Abstract**

One hundred eighty (180) unsexed day old 'Cobb400' broiler chicks of same hatch were weighed individually and distributed randomly into four treatment groups, consisting 45 chicks in each treatment group. Each group was further divided into three replicates of 15 birds each. The four treatments were *viz*. – control - without supplementation of probiotic or prebiotic ($T_1$), Prebiotic supplementation @ 500 g/tonne of feed ($T_2$), Probiotic supplementation @ 100 g/tonne of feed ($T_3$), Synbiotic supplementation in which probiotic @ 100 g/tonne of feed and prebiotic @ 500 g/tonne of feed ($T_4$). The chicks were reared in deep litter system and standard farm managemental practices were followed.

The body weight, body weight gain, feed consumption of broiler feeding were studied. The dietary supplementation of probiotic and synbiotic had better ($P<0.05$) body weight as compared to control and prebiotic fed birds.

**Keywords**: Prebiotic; Probiotic; Feed Consumption; Body Weight Gain; Supplementation.

## Introduction

Poultry farming is one of the fastest growing segment of agro livestock industry in India. The potential of poultry farming as a viable industry is reflected in the amazing growth of the agriculture sector during last three decades and the same has not been recorded in any other agriculture sector.

Poultry occupies an important place in Indian economy contributing more than Rs. 11,000 crores to the national GDP. India ranks 3rd and 5th with respect to production of egg and meat respectively in the world (BAHS,2010). The per capita availability of poultry meat is 2.15 kg/annum which is very less as against the recommendation of 11 kg meat/annum given by NIN (National Institute of Nutrition) (Prabhakaran, 2012). Now a day, the efficiency of poultry to convert the feed into meat plays a key role in economics of broiler industry. Therefore, it is highly essential to improve feed efficiency of poultry to produce meat economically and also food safety is more seriously considered than before. On the other hand, economy of food production is also a factor that cannot be ignored. A huge amount of antibiotics have been used to control diseases and improve performances in livestock. However, due to growing concerns about antibiotic resistance and the potential for a ban for antibiotic growth promoters in many countries in the world, there is an increasing interest in finding alternatives to antibiotics in poultry production.

Despite the spectacular growth in broiler production, the per capita consumption of broiler

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meat in India is nearly 1000 g/year (Vaidya, 2003) which is much below the per capita ICMR recommendation of 9 kg and also against 25 Kg per head per annum in developed countries. Though, an expected growth is apparent in poultry industry, a severe crisis is seen due to rising feed cost, emergence of new diseases like bird flu and lowered meat and egg prices. Presently the margin between profit and loss in the poultry industry is very nominal and profit in the poultry farming is possible only when the farm achieves maximum production with minimum inputs.

Prebiotics are non -digestive feed ingredients that beneficially affect the host by selectively stimulating the growth or activity of one or a limited number of bacteria in the colon, and thus attempt to improve host health (Gibson and Roberfroid,1995). Mannan-oligosaccharides derived from yeast cell wall has generated considerable interest among researchers and commercial livestock producers. A wide variety of oligosaccharides (fructo-oligosaccharides, galacto-oligosaccharides, gluco-oligosaccharides, mannan-oligosaccharides) are commercial available as prebiotic feed additives.

Probiotic bacterial preparations, blend of organic acids and supplemental exogenous enzymes are the long list of alternatives. The word "probiotic" is derived from the Greek, meaning "for Life". Fuller (1989) defined probiotic as "A live microbial feed supplement which beneficially affects the host animal by improving its intestinal microbial balance," Probiotic is a culture of specific living micro organism primarily Lactobacillus,

Synbiotics refer to nutritional supplements combining probiotics and prebiotics and in a form of synergism. The main reason for using a synbiotic is that a true probiotic, without its prebiotic food, does not survive well in the digestive system. Without the necessary food source for the probiotic, it will have a greater intolerance for oxygen, low pH, and temperature. As prebiotics provides a great place for probiotics to thrive, the population of these good bacteria is known to preserve. Synbiotics work in two ways, by improving the viability of probiotics and by delivering specific health benefits (Sekhon and jairath, 2010).

Keeping in mind the beneficial effect of prebiotics and probiotics , the present work was taken up to assess the effect of prebiotics, probiotics and their combination on performance of broilers.

**Materials and Methods**

The present research work was carried out on a private farm named M.J.(Alpha) poultry farm at dangiya village of dantiwada taluka of Banaskantha district. The research work was conducted for six weeks from 8$^{th}$ September to 20$^{th}$ October, 2013 and began with one hundred andeighty(180) unsexed day old commercial broiler chicks of strain 'Cobb400'.

Total of one hundred eighty unsexed day old commercial broiler chicks of (Cobb 400) strain were procured from M.J. hatchery, Mumanvas. All the chicks were weighed individually using digital weighing balance. The chicks were randomly assigned to four dietary treatment of 45 chicks per treatment. Each group was further divided into three replicates of 15 birds each.

First group of birds were kept as a control and the feed of these group were not supplied with either prebiotic or probiotic in broiler prestarter, starter and finisher diet. Prebiotics in the feed of $T_2$ group was given at the rate of 500 g/tonne of feed during prestarter (0- 10 days), starter (11-21days) and finisher (22- 42 days) phase. Probiotics in the feed of $T_3$ group was given at the rate of 100 g/tonne of feed during prestarter, starter and finisher phase. Whereas, in treatment 4 ($T_4$) combination of prebiotic and probiotic was given at the same level as in $T_2$ and $T_3$ during prestarter, starter and finisher phase. The four treatments were : T1 = control (Feed without probiotic or prebiotic supplementationm)

T2 = Prebiotic supplementation in feed (500 g/ tonne of feed )

T3 = Probiotic supplementation in feed (100 g/ tonne of feed )

T4 = Prebiotic (500 g/tonne of feed ) + Probiotic (100 g/tonne of feed )

The basal diet was procured from commercial feed mill and considered as control. The Broiler chicks were fed in three phases *viz*. pre-starter (0–10 days), starter (11–21 days) and finisher (22–42 days). Feed and water were offered *ad libitium* to each group throughout experimental period.

The details regarding the proportions of feed ingredients used for manufacturing of basal diet and calculated nutrient composition of basal diet are given in Table 3.2. Nutrient levels of the diets for broilers were based on the NRC (1994) recommendations of nutrient requirements of broiler chickens.

**Table 1:** Distribution of experimental broiler chicks under various treatments.

| Treatments | Replicate 1 | Replicate 2 | Replicate 3 | Total chicks / treatment |
|---|---|---|---|---|
| **T1 Control** | 15 | 15 | 15 | **45** |
| **T2 Prebiotic** | 15 | 15 | 15 | **45** |
| **T3 Probiotic** | 15 | 15 | 15 | **45** |
| **T4 Prebiotic + Probiotic(synbiotic)** | 15 | 15 | 15 | **45** |

**Table 2: Proportion of feed ingredients and nutrient composition (%) of basal diet.**

| | Proportions (%) | | |
|---|---|---|---|
| **Ingredients** | **Broiler Pre-starter (0-10 d)** | **Broiler Starter (11-21 d)** | **Broiler Finisher (22-42 d)** |
| Maize | 50.28 | 54.92 | 60.38 |
| Soyabean meal | 42.21 | 36.73 | 31.18 |
| Vegetable oil | 3.56 | 4.33 | 4.85 |
| Dicalcium phosphate | 1.93 | 1.97 | 1.71 |
| Common salt | 0.35 | 0.35 | 0.35 |
| Limestone | 0.97 | 1.01 | 0.93 |
| Maduramycine | 0.05 | 0.05 | 0.05 |
| Lipocare[1] | 0.10 | 0.10 | 0.10 |
| L-Lysine | 0.17 | 0.15 | 0.14 |
| DL-Methionine | 0.15 | 0.15 | 0.07 |
| Vitamin premix[2] | 0.05 | 0.05 | 0.05 |
| Mineral premix[3] | 0.20 | 0.20 | 0.20 |
| Total | 100.02 | 100.01 | 100.01 |
| Nutrient composition | | | |
| ME (Kcal/kg) | 2800 | 2950 | 3020 |
| Crude Protein (%) | 22.90 | 21.30 | 19.10 |
| Calcium (%) | 0.97 | 0.92 | 0.86 |
| Phosphorus (%) | 0.45 | 0.45 | 0.40 |

- Lecithin treated with co-enzyme
- Provides per kg of diet: 12500 IU vitamin A; 2500 IU vitamin D3; 12 mg vitamin E; 1.5 mg vitamin K; 1.5 mg vitamin B1; 5 mg vitamin B2; 2 mg vitamin B6, 15 mcg vitamin B12; 15 mg niacin, 10 mg pantothenic acid and 0.5 mg folic acid.
- Provides per kg of diet: 50 mg iron, 10 mg copper, 50 mg zinc, 80 mg manganese, 1 mg iodine and 0.2 mg selenium

A feeding trial of 6 weeks was carried out with the chicks divided into various experimental groups. The birds were reared on deep litter system of housing. The litter material of 3 inch thickness was spread over the floor. Experimental groups and replicates were separated using wire net partitioning. All groups were provided with individual feeder and waterer.

Feed was offered *ad-libitum* in weighed quantity once in a day for first two weeks and then twice a day for rest of experimental period. The feeders were not filled more than two third during first two weeks period, so as to minimize the wastage of feed. Manual turning and mixing of feed was done frequently four to five times in a day. Clean, fresh, wholesome drinking water was made available to all the experimental birds *ad libitum* throughout the study period.

All the experimental chicks were vaccinated against New Castle Disease (Lasota strain) by intra-ocular method at 7$^{th}$day of age. On 14$^{th}$day of age chicks were vaccinated against Infectious Bursal Disease(Intermediate strainn). Finally, on 28$^{th}$ day booster dose of New Castle Disease (Lasota Strain) was given. Every care was taken for watering and feeding. Strict and thorough sanitary measures were adopted and care was taken not to allow any scavengers in the poultry house, so as to minimize the disease occurrence.

The following observations related to the objective of the study were recorded regularly for the individual birds as per the schedule described below: Accurate body weight of the individual experimental chicks were recorded in the morning hours before feeding with the help of digital weighing balance at day old and thereafter at weekly interval till six weeks of age.

Broiler chicks were weighed individually at weekly interval up to six weeks of age and the data for weekly body weight gain was obtained by calculating differences between the live body weights of previous week from that of current week and recorded in grams (g).

Weekly Body Weight Gain (g) = Current Week Weight (g) – Previous Week Weight (g)

The weighed quantity of feed was offered to each experimental group under the study and was daily recorded. At the end of week feed left over were collected, weighed and recorded. The difference between the weight of feed offered during period of seven days and the feed left over on the last day was calculated to know the feed consumption of the birds. The average feed intake in gram / bird was calculated for each treatment by dividing the total amount of feed consumed by the number of chicks in the particular treatment during different weeks.

Feed consumption and body weight gain for each week were worked out for each treatment separately.

**Statistical Analysis**

All the recorded and calculated data were subjected to statistical analysis by applying "Completely Randomized Design" (CRD) employing one-way analysis of variance as per Snedecor and Cochran (1994). A p-value of $< 0.05$ considered a significant difference among groups and the comparison of means was made using Duncan multiple range test (Steel and Torrie, 1984).

**Results And Discussion**

Supplementing animal feeds with antibiotic based growth promoters is presently facing serious criticism and has raised global concern as some reports revealed their ill effects among which are development of microbial resistance to the pathogens and their potential harmful effects on human health. These shortcomings led to the search for alternative substances like probiotics, prebiotics and medicinal plants as natural feed additives which can be used in poultry diets to enhance the performance and immune response of birds. In this regard prebiotic and probiotic seems to have potential to be used as growth promoter as an alternative to antibiotics. The present study was undertaken to find out the effect of dietary supplementation of prebiotic, probiotic and synbiotic on growth performance of broiler chicks.

**Feed intake**

The total feed intake per bird per week during different time period has been presented in table 3.

Total feed intake during first week of age was 137.16 ± 2.28 g, 140.78 ± 4.20 g, 141.51 ± 2.31 g and 141.78 ± 4.64 g for $T_1$, $T_2$, $T_3$ and $T_4$ groups, respectively. The highest feed consumption was observed in synbiotic supplemented group ($T_4$) which was followed by $T_3$, $T_2$ and $T_1$ group. There was a non significant difference between all treatment groups, suggests that total feed consumption was not affected by inclusion of prebiotic, probiotic or synbiotic during first week.

Total feed intake during second week was 336.73 ± 11.78 g, 362.49 ± 4.69 g, 343.05 ± 7.58 g and 347.87 ± 6.75 g for $T_1$, $T_2$, $T_3$ and $T_4$ groups, respectively. The highest feed consumption was in the prebiotic group ($T_2$) which was followed by $T_4$, $T_3$ and $T_1$ group. There was a non significant difference between all treatment groups.

Total feed consumption during third week was 596.94 ± 23.45 g, 579.42 ± 20.80 g, 596.58 ± 20.96 g and 566.07 ± 18.84 g for $T_1$, $T_2$, $T_3$ and $T_4$ groups, respectively. The highest feed consumption was in the control group ($T_1$) which was followed by $T_3$, $T_2$ and $T_1$ group. Feed consumption was not differed by inclusion of prebiotic, probiotic or synbiotic in different treatments.

Total feed consumption during fourth week was 729.38 ± 17.27 g, 731.76 ± 14.15 g, 756.80 ± 16.27 g and 752.82 ± 43.81 g for $T_1$, $T_2$, $T_3$ and $T_4$ groups, respectively. The highest feed consumption was in the probiotic group ($T_3$) which was followed by $T_4$, $T_2$ and $T_1$ group. There was a non significant difference between all treatment groups.

Total feed consumption during fifth week was 850.22 ± 15.71 g, 866.40 ± 47.94 g, 888.56 ± 16.82 g and 828.24 ± 25.23 g for $T_1$, $T_2$, $T_3$ and $T_4$ groups, respectively. The highest feed consumption was in the probiotic group ($T_3$) which was followed by $T_2$, $T_1$ and $T_4$ group. There was a non significant difference between all treatment groups.

**Table 3: Average feed intake (g/bird/week) of broilers under different treatment groups**

| Weeks | Treatments | | | | Level of Significance |
|---|---|---|---|---|---|
| | T1 | T2 | T3 | T4 | |
| I | 137.16 ± 2.28 | 140.78 ± 4.20 | 141.51 ± 2.31 | 141.78 ± 4.64 | NS |
| II | 336.73 ± 11.78 | 362.49 ± 4.69 | 343.05 ± 7.58 | 347.87 ± 6.75 | NS |
| III | 596.94 ± 23.45 | 579.42 ± 20.80 | 596.58 ± 20.96 | 566.07 ± 18.84 | NS |
| IV | 729.38 ± 17.27 | 731.76 ± 14.15 | 756.80 ± 16.27 | 752.82 ± 43.81 | NS |
| V | 850.22 ± 15.71 | 866.40 ± 47.94 | 888.56 ± 16.82 | 828.24 ± 25.23 | NS |
| VI | 1065.89 ± 40.59 | 1082.53 ± 56.25 | 1110.51 ± 29.81 | 1141.82 ± 32.47 | NS |
| 0-VI (Total) | 3716.31 ± 6.57 | 3763.38 ±129.88 | 3837.00 ± 36.51 | 3778.60 ±122.42 | NS |

· NS- Non significant

Total feed consumption during sixth week was 1065.89 ± 40.59 g, 1082.53 ± 56.25 g, 1110.51 ± 29.81 g and 1141.82 ± 32.47 g for $T_1$, $T_2$, $T_3$ and $T_4$ groups, respectively. The highest feed consumption was in the synbiotic group ($T_4$) which was followed by $T_3$, $T_2$ and $T_1$ group. Feed consumption was not affected significantly by inclusion of prebiotic, probiotic or synbiotic in different treatments.

Total feed consumption during entire experiment (0-6 weeks) was 3716.31 ± 6.57 g, 3763.38 ± 129.88 g, 3837.00 ± 36.51 g and 3778.60 ± 122.42 g for $T_1$, $T_2$, $T_3$ and $T_4$ groups, respectively. The highest feed

consumption was in the probiotic group ($T_3$) which was followed by $T_4$, $T_2$ and $T_1$ group. Feed consumption was not affected significantly by inclusion of prebiotic, probiotic or synbiotic in different treatments.

The present result were similar with Anjum *et al.* (2005), Shendare *et al.* (2008) and Kathirvelan *et al.*(2012) as they recorded lower feed consumption than present study. Ramlah and Tan (1995), Elangovan *et al.* (2005), Mountzouris *et al.* (2010), Roozbeh Shabani *et al.*(2012), Houshmand *et al.* (2012) and Seifi *et al.* (2013) had found non-significant effect on feed intake.

*Body Weight*

The body weights of chicks were recorded at weekly intervals during entire period of 6 weeks, as the changes in body weight is very reliable measure of performance of chicks subjected to various treatments. Average values of body weight under different treatment groups for different weeks is presented in Table 4.

The average initial body weight of the broiler chicks were 42.69 ± 0.45 g, 42.53 ± 0.53 g, 42.64 ± 0.46 g and 42.22 ± 0.41 g under treatment groups $T_1$,$T_2$,$T_3$ and $T_4$, respectively. The body weight at day old age remained comparable amongs different dietary treatment group including control.

The average body weight at the end of first week were 165.51 ± 1.91 g, 169.60 ± 2.22 g, 169.71 ± 2.23 g and 171.07 ± 2.18 g under treatment groups $T_1$, $T_2$, $T_3$ and $T_4$, respectively. At the end of first week, highest body weight was observed in the synbiotic group ($T_4$) (171.07 ± 2.18 g) followed by $T_3$, $T_2$ and $T_1$. The body weight at first week of age did not differ significant among different dietary treatment groups.

The average body weight at the end of second week were 418.91 ± 4.65 g, 438.36 ± 4.52 g, 430.09 ± 5.62 g and 437.69 ± 4.77 g under treatment groups $T_1$, $T_2$, $T_3$ and $T_4$, respectively.$T_2$ and $T_4$ shown higher body weight and also differed significantly ($P<0.05$) with control group while a non-significant difference observed by probiotic supplementation group($T_3$). There was a non-significant difference amongst supplement groups. At the end of second week, highest body weight was observed in the prebiotic group ($T_2$) (438.36 ± 4.52 g) followed by $T_4$, $T_3$ and $T_1$.

The average body weight at the end of third week were 813.13 ± 12.51 g, 822.11 ± 9.93 g, 829.36 ± 10.07 g and 822.62 ± 10.09 g under treatment groups $T_1$, $T_2$, $T_3$ and $T_4$, respectively. At the end of third week, highest body weight was observed in the probiotic group ($T_3$) (829.36 ± 10.07 g) followed by $T_4$, $T_2$ and $T_1$.

**Table 4: Average body weight (g/bird) of broilers under different treatment groups**

| Weeks | Treatments | | | |
|---|---|---|---|---|
| | T1 | T2 | T3 | T4 |
| Day old | 42.69 ±0.45 | 42.53 ± 0.53 | 42.64 ± 0.46 | 42.22 ± 0.41 |
| I | 165.51 ±1.91 | 169.60 ± 2.22 | 169.71 ± 2.23 | 171.07 ± 2.18 |
| II | $418.91^{a}$ ±4.65 | $438.36^{b}$ ± 4.52 | $430.09^{ab}$ ± 5.62 | $437.69^{b}$ ± 4.77 |
| III | 813.13 ±12.51 | 822.11 ± 9.93 | 829.36 ± 10.07 | 822.62 ± 10.09 |
| IV | 1237.18 ±14.38 | 1249.60 ±11.57 | 1272.27 ± 11.82 | 1275.18 ±11.53 |
| V | $1675.90^{a}$ ±16.62 | $1705.60^{ab}$ ± 18.28 | $1748.10^{b}$ ± 14.57 | $1727.50^{b}$ ± 14.63 |
| VI | $2184.11^{a}$ ±25.70 | $2222.22^{ab}$ ± 29.83 | $2276.09^{b}$ ± 31.29 | $2284.25^{b}$ ±20.83 |

*value bearing different superscript differed significantly ($P<0.05$) ; NS- Non significant

**Table 5: Average body weight gain (g/bird) of broilers under different treatment groups**

| Weeks | Treatments | | | |
|---|---|---|---|---|
| | T1 | T2 | T3 | T4 |
| I | 122.82 ± 1.92 | 127.07 ± 2.27 | 7 ± 2.42 | 128.84 ± 2.19 |
| II | 253.40 ± 4.90 | 268.76 ± 5.51 | 8 ± 6.14 | 266.62 ± 5.48 |
| III | 394.22 ± 13.43 | 383.76 ± 10.14 | 7 ± 11.28 | 384.93 ± 10.36 |
| IV | 424.04 ± 12.31 | 427.49 ±11.66 | 1 ±11.00 | 452.56 ±11.93 |
| V | 438.76 ± 14.14 | 456.00 ± 12.94 | 7 ±12.29 | 449.45 ±12.74 |
| VI | 508.18 ±15.40 | 516.62 ±18.41 | 2±21.41 | 556.75 ±9.71 |
| 0-VI (Total) | 2141.41 ± 25.75 | 2179.69 ±29.76 | )4±32.24 | 2216.80 ±32.44 |

The body weight at third week stage did not differ amongst different treatments.

The average body weight at the end of fourth week were 1237.18 ± 14.38 g, 1249.60 ± 11.57 g, 1272.27 ± 11.82 g and 1275.18 ± 11.53 g under treatment groups $T_1$, $T_2$, $T_3$ and $T_4$, respectively. At the end of fourth week, highest body weight was observed in the synbiotic group ($T_4$) (1275.18 ± 11.53 g) followed by $T_3$, $T_2$ and $T_1$. The body weight at fourth week stage did not differ amongst different treatments.

The average body weight at the end of fifth week were 1675.90 ± 16.62 g, 1705.60 ± 18.28 g, 1748.10 ± 14.57 g and 1727.50 ± 14.63 g under treatment groups $T_1$, $T_2$, $T_3$ and $T_4$, respectively.$T_3$ and $T_4$ shown higher body weight and also differed significantly (P<0.05) with control group while a non-significant difference observed by prebiotic supplementation group($T_2$). There was a non-significant difference amongst supplement groups. At the end of fifth week, highest body weight was observed in the probiotic group ($T_3$) (1748.10 ± 14.57 g) followed by $T_4$, $T_2$ and $T_1$.

The average body weight at the end of sixth week were 2184.11 ± 25.70 g, 2222.22 ± 29.83 g, 2276.09 ± 31.29 g and 2284.25 ± 20.83 g under treatment groups $T_1$, $T_2$, $T_3$ and $T_4$, respectively.$T_3$ and $T_4$ shown higher body weight and also differed significantly (P<0.05) with control group while a non-significant difference observed by prebiotic supplementation group($T_2$). There was a no significant difference among supplement groups. At the end of sixth week, highest body weight was observed in the synbiotic group ($T_4$) (2284.25 ± 20.83 g) followed by $T_3$, $T_2$ and $T_1$.

The result of present study were inline with earlier work of Ramlah and Tan (1995), Khaksefidi and Rahimi (2005), Hosamani *et al*. (2006), Awad *et al.* (2009), Bozkurt *et al.* (2009), Mayahi *et al.*(2010), Munj *et al.* (2010), Bansal *et al.* (2011), Dizaji *et al*. (2012), Behrouz *et al*. (2012) and Tabidi *et al.* (2013) research workers who had got significantly result of final body weight.

The findings of Anjum *et al.* (2005), Khaksefidi and Rahimi (2005), Hosamani *et al*. (2006), Shendare *et al.*(2008), Awad *et al.* (2009), Bozkurt *et al.* (2009), Munj *et al.* (2010), and Dizaji *et al*. (2012) in which all research workers recorded lower body weight at 6th week of age in comparisom to present findings.

Midilli *et al.* (2008) and Mayahi *et al.*(2010) recorded higher body weight than present study and Amer and Khan (2012) recorded lower body weight than present study whose results were non-significant between treatment groups and control. Dizaji *et al.* (2012) found that prebiotic and synbiotic group was having significantly (P< 0.05) higher body weight than control but probiotic group had non-significant difference with control group.

It was observed that body weight at different age were not differed significantly amongst supplemented groups but they differed (P<0.05) with control group. Synbiotic ($T_4$) supplemented group gained higher body weight at 1st, 4th and 6th week of age. While probiotic group ($T_3$) was got the higher body weight at 3rd and 5th week of age. While prebiotic group ($T_2$) was higher in body weight at 2nd week of age only.

Hence ,it can be concluded that if synbiotic supplied at the rate of combination of prebiotic (500 g/tonne of feed) and Probiotic (100 g/tonne of feed) found most beneficial as compared to prebiotic and probiotic alone.

**Body Weight Gain**

The data for average gain in body weight for different period of time have been presented in Table 5.

Average gain in the body weight during first week of age were 122.82 ± 1.92 g, 127.07 ± 2.27 g, 127.07 ± 2.42 and 128.84 ± 2.19 g for treatment $T_1$, $T_2$, $T_3$, and $T_4$ groups, respectively. The higher body weight gain was observed in the synbiotic supplemented group ($T_4$) which was followed by $T_3$, $T_2$ and $T_1$ groups. The body weight gain of first week of age did not reach upto the significant level.

During period of second week, the gain in body weights was 253.40 ± 4.90 g, 268.76 ± 5.51 g, 260.38 ± 6.14 and 266.62 ± 5.48 g for treatment $T_1$, $T_2$, $T_3$, and $T_4$ groups, respectively. The higher body weight gain was observed in the prebiotic supplemented group ($T_2$) which was followed by $T_4$, $T_3$ and $T_1$ groups, but there was a non significant difference between all treatment groups.

During period of third week, the gain in body weights was 394.22 ± 13.43 g, 383.76 ± 10.14 g, 399.27 ± 11.28 and 384.93 ± 10.36 g for treatment $T_1$, $T_2$, $T_3$, and $T_4$ groups, respectively. The highest body weight gain was observed in the probiotic supplemented group ($T_3$) which was followed by $T_1$, $T_4$ and $T_2$ groups, but there was a non significant difference between all treatment groups.

Body weight gain during the period of fourth week was 424.04 ± 12.31 g, 427.49 ± 11.66 g, 442.91 ± 11.00 and 452.56 ± 11.93 g for treatment $T_1$, $T_2$, $T_3$, and $T_4$ groups, respectively. The highest body weight gain was observed in the synbiotic supplemented group ($T_4$) which was followed by $T_3$, $T_2$ and $T_1$ groups, but there was a non significant difference between all treatment groups.

Average gain in the body weights during fifth week was 438.76 ± 14.14 g, 456.00 ± 12.94 g, 475.87 ± 12.29 and 449.45 ± 12.74 g for treatment $T_1$, $T_2$, $T_3$, and $T_4$ groups, respectively. The higher body weight gain was in the probiotic supplemented group ($T_3$) which was followed by $T_2$, $T_4$ and $T_1$ groups, but there was a non significant difference between all treatment groups.

Body weight gain during the period of sixth week was 508.18 ± 15.40 g, 516.62 ± 18.41 g, 529.32 ± 21.41 and 556.75 ± 9.71 g for treatment $T_1$, $T_2$, $T_3$, and $T_4$ groups, respectively. The highest body weight gain was observed in the synbiotic supplemented group ($T_4$) which was followed by $T_3$, $T_2$ and $T_1$ groups, but there was a non significant difference between all treatment groups.

Body weight gain during entire experimental period (0-6 week) was 2141.41 ± 25.75 g, 2179.69 ± 29.76 g, 2223.04 ± 32.24 and 2216.80 ± 32.44 g for treatment $T_1$, $T_2$, $T_3$, and $T_4$ groups, respectively. Probiotic supplemented group ($T_3$) surpassed all group with highest body weight gain which was followed by $T_4$, $T_2$ and $T_1$ groups, however there was a non significant difference between all treatment groups.

Present findings were similar with earlier findings of Elangovan *et al.* (2005), Li *et al* (2007) and Houshmand *et al.* (2012).

However, it differed from the findings of Yeo and Kim (1997), Khan *et al.* (2000), Islam *et al.* (2004), Anjum *et al.* (2005), Kumar *et al.* (2005), Panda *et al.* (2005), Swain *et al.* (2007), Dabiri *et al.* (2009), Kim *et al.* (2011), and Kathirvelan *et al.* (2012) as they observed significantly higher body weight gain in supplemented group than control group.

Munj *et al.* (2010) found significant ($P<0.05$) difference between synbiotic and control group but prebiotic or probiotic group had non-significant difference with control. Abdel-Raheem and Abd-Allah (2011) found that body weight gain of the probiotic and synbiotic group was significantly ($P<0.05$) higher than control but non-significant difference amongst control and prebiotic group.

The body weight gain during different period failed to achieve significance ($P<0.05$). However, Synbiotic ($T_4$) supplemented group attained higher gain during 1st, 4th and 6th week of age while probiotic group ($T_3$) was got the higher body weight at 3rd and 5th week of age whereas prebiotic group ($T_2$) was higher in body weight at 2nd week of age only.

Present study results were in contrast from Abdel-Raheem and Abd-Allah (2011) as they reported higher feed consumption than present study. Sen *et al.* (2012), Toghyani *et al.* (2011), Taherpour *et al.* (2009) and Kathirvelan *et al.* (2012) had found significant result on feed intake.

Kumar *et al.* (2005) found non-significant difference between supplemental groups and control groups. Midilli *et al.* (2008) found that the synbiotic and control group have non-significant result. Munj *et al.* (2010) and Dizaji *et al.* (2012) found that there was a non significant difference between all treatment groups.

Total feed consumption per bird per week was not affected significantly during whole experimental period in supplemented groups.

pathogenic gut bacteria, thereby improve feed conversion ratio (Bansal *et al.*, 2011). Synbiotic group (T4) gained better FCR during 4th week. So probiotic group (at the rate of 100g/tonne of feed) found to be beneficial as it reduced FCR during most of the stages of the experiment.

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