

Original Research Article

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Effect of Supplemental Microbial Protein Feed on the Broiler Growth Traits

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ABSTRACT

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Three hundred, day old broiler chicks of *Cobb 400* strain were randomly distributed into 5 treatments with 3 replications, each replicate contained 20 chicks. The five diets were formulated with supplementation of Rumen digesta as 0% (control), 5%, 10%, 15% and 20% and coded as T1, T2, T3, T4 and T5 respectively. Growth Performance Traits *i.e.* feed consumption, Body weight, Body weight gain and Feed conversion ratio (FCR) were recorded to evaluate the growth performance. The body weights and body weight gain of experimental broiler chickens increased significantly ($p < 0.05$) with increase in the level of supplementation with microbial protein of dried rumen digesta while Feed consumption and feed conversion ratio decreased with increasing level of supplementation of dried rumen digesta in the diets of experimental broiler.

Introduction

According to United Nations the Indian population was 1.32 billion in 2016, second most populated country in the world and stipulated to be first by the year 2022. The living status of the people is increasing day by day which leads to increase in paying capacity. Among non-vegetarian food chicken is widely accepted having no religious foundation which has lead to boom in poultry industry in last 2-3 decades. Egg production has increased from 50.70 billion (2006-07) to 66.45 billion (2011-12). As per the nineteenth livestock census we are having 729.21 million

poultry population. (DAHD, 2016-17). India ranks third in egg and fourth in chicken production in the world. Within last twenty five year duration the egg production has gone up to 70 billion from few millions and the broiler production has gone to 3.8 million tones from nowhere. The annual growth rate of broiler chicken production is 10-12%. The per capita egg consumption has gone up from 30 to 68 and the chicken meat from 400 gm to 2.5 kg. Recommendation for human being is 180 eggs and 10 kg chicken per year (APEDA 2016). We are lacking behind and there is

enormous scope in increasing production. As we know that about 65% of cost of production is on feed. So we need to cut it down to decrease the production cost of broiler chicken. To cater this and to explore alternative cheap feed source the experimental trail has been designed entitled 'Effect of supplementation of diet with microbial protein of dried rumen digesta on growth performance of Broiler Chicken'.

Materials and Methods

The experiment was conducted at the Poultry Research and Training Centre, Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut. Three hundred, day old broiler chicks of *Cobb 400* strain were purchased from Venky's (India) Limited. They were randomly distributed into 5 treatments with 3 replications, each replicate contained 20 chicks. The five diets were formulated with supplementation of Rumen digesta as 0% (control), 5%, 10%, 15% and 20% and coded as T1, T2, T3, T4 and T5 respectively. The birds were given non-pelleted diets and water *ad libitum* throughout the period of the study (42 days). The chicks were fed starter diet from (1 to 21 days) and a finisher diet from (22 to 42 days). Analysis of the experimental diets was carried out for moisture, nitrogen, ether extract, crude fiber, nitrogen free extract and energy according to the procedures of Association of Official Analytical Chemists (A.O.A.C, 1995) using triplicate samples for each determination, crude protein was calculate as nitrogen content x 6.25.

Rumen content or digesta is a waste product from the rumen of slaughtered buffalo. It is obtained when the rumen of the buffalo is cut open. The drained rumen content was sun dried and then bagged and stored. Fresh buffalo rumen digesta was collected from Ali Faheem Meatex Pvt. Ltd Factory, Alipur, Dhikoli, Hapur Road, Meerut-250002 (U.P.)

India. The Sun dried bovine rumen content was milled in a hammer mill to produce finely ground dried rumen content to supplement the feed.

Four Growth Performance Traits i.e. feed consumption, Body weight, Body weight gain and Feed conversion ratio (FCR) were recorded to evaluate the growth performance. Feed consumption and body weight were recorded at 1, 2, 3, 4, 5 and 6-weeks of age. Body weight gain was calculated every week by the equation: Body weight gain = B.W at the end of week - B.W at the beginning of week. Feed conversion ratio (FCR) was calculated at the end of experiment and it is the amount of feed consumed per unit of body weight gain (feed consumption (g)/ weight gain (g)).

The data was analyzed using OPSTAT-Statistical Package for Agricultural Research Workers to determine the descriptive characteristics of the parameters between the various treatment groups. Duncan Multi Range of DSAASTAT, Perugia-Italy was used to determine the significant difference of the parameters between groups.

Results and Discussion

Weekly body weight, body weight gain, feed consumption and feed conversion ratios of broiler chickens fed on diets supplemented with different levels microbial protein of dried rumen digesta were studied during the experimental period of 6 weeks. Nutritional value of dried rumen digesta used in our experiment was found as Moisture 15.45%, Crude Fiber 34.10%, Crude Protein 8.50%, Ash 14.53%, Ether Extract 7.55%, Nitrogen Free extract 35.32%, and Metabolized Energy 1800 (Kcal/kg).

The body weights and body weight gain of experimental broiler chickens increased significantly ($p < 0.05$) with increase in the

level of supplementation with microbial protein of dried rumen digesta throughout the experimental period and shown in the table 02 and 03 respectively. The highest body weights were recorded on chickens fed on diets supplemented with 20% microbial protein of dried rumen digesta and the lowest body weights were recorded on control group. The findings of the study are in agreement with the previous studies by Okorie, (2005) who observed the birds fed dried rumen content diets performed better than the control group. This improved performance could be

attributed to higher protein component (microbial protein), long chain fatty acids and partially digested feed protein. Elfaki *et al.*, (2015) reported that body weight gain was significantly ($p < 0.01$) higher on dried rumen content. Esonu *et al.*, (2006), who reported birds on diets containing dried rumen digesta recorded higher body weight gain than the control group. However, this increase in body weight was not significant ($p > 0.05$). Makinde *et al.*, (2008) and Yitbarek *et al.*, (2016) reported no significant effect of dried rumen digesta on body weight.

Table.1 Mean weekly and total feed consumption of different treatment groups (gm)

Group	Weekly Feed consumption in gm						
	1	2	3	4	5	6	1 - 6
T1	140.69 ^b ± 1.47	261.01 ^a ± 1.78	438.03 ^a ± 1.31	673.31 ^{bc} ± 0.84	767.99 ^c ± 1.50	1143.06 ^b ± 1.47	3424.08 ^c ± 4.55
T2	139.08 ^{ab} ± 1.28	274.47 ^b ± 1.19	441.10 ^a ± 1.12	670.16 ^b ± 1.00	763.79 ^c ± 1.22	1044.23 ^a ± 1.28	3332.76 ^b ± 3.44
T3	140.60 ^b ± 1.67	290.89 ^c ± 1.06	450.74 ^b ± 0.77	678.13 ^c ± 1.58	751.96 ^b ± 1.94	1040.36 ^a ± 1.17	3352.69 ^b ± 1.31
T4	138.18 ^a ± 1.27	293.23 ^c ± 2.06	457.55 ^c ± 1.59	668.51 ^b ± 1.52	742.84 ^{ab} ± 1.59	1032.95 ^a ± 1.51	3333.25 ^b ± 5.65
T5	139.98 ^b ± 0.56	260.32 ^a ± 1.50	440.60 ^a ± 1.26	654.83 ^a ± 2.31	732.68 ^a ± 1.58	1022.65 ^a ± 1.41	3251.05 ^a ± 2.54
CD	N.S.	4.979	3.961	4.906	5.038	4.400	12.099

Values in the same column with different superscripts are significantly different ($p < 0.05$)

Table.2 Weekly body weight of broiler chicks in grams for the different treatment groups

Group	Weekly body weight in gm						
	0	1	2	3	4	5	6
T1	40.45 ^b ± 0.19	145.62 ^a ± 0.51	302.09 ^a ± 1.01	677.20 ^a ± 1.45	1141.27 ^a ± 1.44	1629.38 ^a ± 2.40	2176.21 ^a ± 2.07
T2	40.01 ^{ab} ± 0.48	149.29 ^{ab} ± 2.07	310.54 ^b ± 2.65	691.64 ^b ± 3.83	1162.13 ^b ± 5.42	1654.95 ^b ± 6.78	2209.09 ^b ± 7.83
T3	39.99 ^{ab} ± 0.62	150.37 ^b ± 1.96	314.71 ^b ± 1.55	697.66 ^b ± 1.46	1173.35 ^b ± 1.82	1671.84 ^{bc} ± 1.98	2231.59 ^{bc} ± 2.84
T4	39.77 ^a ± 0.53	157.79 ^c ± 1.55	324.73 ^c ± 1.03	712.05 ^c ± 1.45	1192.99 ^c ± 2.83	1694.06 ^{cd} ± 1.88	2258.09 ^{cd} ± 1.20
T5	40.39 ^b ± 0.28	158.89 ^c ± 0.36	325.51 ^c ± 0.66	715.21 ^c ± 0.70	1198.36 ^c ± 1.08	1704.78 ^d ± 1.55	2270.23 ^d ± 1.17
CD	NS	4.719	4.931	6.610	9.342	11.197	12.48

Values in the same column with different superscripts are significantly different ($p < 0.05$)

Table.3 Body weight gain of broiler chicks for different treatment groups

Group s	Weekly body weight gain in gm						
	1	2	3	4	5	6	1 - 6
T1	105.17 ^a ± 0.35	156.47 ^a ± 1.23	375.12 ^a ± 0.44	464.07 ^a ± 1.08	488.11 ^a ± 1.18	546.83 ^a ± 0.84	2135.76 ^a ± 1.90
T2	109.28 ^a ± 1.62	170.25 ^b ± 9.57	381.10 ^b ± 1.19	475.04 ^b ± 5.25	492.82 ^a ± 1.39	554.14 ^b ± 1.13	2169.08 ^b ± 7.36
T3	109.02 ^a ± 1.35	164.35 ^b ± 0.50	384.85 ^{bc} ± 1.53	475.69 ^b ± 1.10	498.48 ^b ± 0.43	559.75 ^{bc} ± 1.41	2191.60 ^{bc} ± 2.74
T4	118.01 ^b ± 1.17	166.95 ^b ± 0.55	387.32 ^{cd} ± 0.68	480.94 ^{bc} ± 1.21	501.07 ^b ± 0.77	563.70 ^{cd} ± 0.88	2218.32 ^{cd} ± 1.32
T5	118.49 ^b ± 0.54	166.62 ^b ± 0.38	390.87 ^d ± 0.00	483.15 ^c ± 0.81	506.42 ^c ± 0.50	565.45 ^d ± 0.39	2229.83 ^d ± 1.01
CD	3.56	NS	3.00	8.08	2.97	3.15	11.79

Values in the same column with different superscripts are significantly different (p<0.05)

Table.4 Feed conversion ratio at the end of 6th weeks of age experimental trail

S.N.	Treatment	Total Body Weight Gain 1-6 weeks in gm	1-6 week Feed Consumption in gm	FCR at the end of 6 week	SEM
1.	T ₁	2135.76 ^a ± 1.90	3424.08 ^c ± 4.55	1.602 ^d	0.002
2.	T ₂	2169.08 ^b ± 7.36	3332.76 ^b ± 3.44	1.536 ^c	0.005
3.	T ₃	2191.60 ^{bc} ± 2.74	3352.69 ^b ± 1.31	1.524 ^{bc}	0.004
4.	T ₄	2218.32 ^{cd} ± 1.32	3333.25 ^b ± 5.65	1.497 ^b	0.003
5.	T ₅	2229.83 ^d ± 1.01	3251.05 ^a ± 2.54	1.457 ^a	0.001
CD –				0.010	

Values in the same column with different superscripts are significantly different (p<0.05)

The feed consumption and feed conversion ratio recorded on all treatment groups differed significantly (p<0.05) throughout the experimental period of 6 weeks and shown in the table 01 and 04 respectively. The highest feed consumption was recorded on broiler chicken in control group (0% microbial protein of dried rumen digesta) and the lowest feed consumption was recorded on 20% microbial protein of dried rumen digesta. Feed consumption decreased as the level of supplementation with microbial protein of dried rumen digesta increases. This lowered feed consumption may be due to unconventional feed. The feed conversion ratios of 1.602 ± 0.002, 1.536 ± 0.005, 1.524 ± 0.004, 1.497 ± 0.003 and 1.457 ± 0.001 were recorded for T1, T2, T3, T4 and T5 group respectively. The highest feed conversion ratio was recorded on broiler chicken fed on control diets and the

lowest feed conversion ratio was recorded on broiler chicken fed on diets containing 20% microbial protein of dried rumen digesta (T5). The results of the current study are not in agreement with the previous findings by Esonu *et al.*, (2006) who reported feed intake of the birds on varying inclusion levels of dried rumen digesta were significantly (p<0.05) higher than the control group. Adeniji and Jimoh (2007) observed there was significant effect (p<0.05) of the levels of rumen content on the observed feed intake. The 15% rumen content fed chicks had the best (p<0.05) feed conversion ratio which is comparable to the feed conversion ratio obtained on the chicks fed 10 and 20% rumen content diets. Esonu *et al.*, (2011) reported that the group on the control diet recorded the best feed conversion ratio while the group on 20% gave the poorest feed conversion ratio. Elfaki *et al.*, (2015) observed

that an increased feed intake and growth rate by increasing the level of dry rumen content in the diets while feed conversion ratio was not affected ($p>0.05$) by dietary treatments.

The body weight and body weight gain of experimental broiler chicken increased significantly ($p<0.05$) with increase in the level of supplementation with microbial protein of dried rumen digesta throughout the experimental period. The feed consumption of broilers revealed significant reduction due to the inclusion level microbial protein of dried rumen digesta supplementation. Maximum feed consumption was noted in the control group and minimum in highest supplementation group of broilers. Though dried rumen digesta supplementation showed significantly higher body weight and body weight gain but the study showed significant reduction in feed conversion ratio as supplementation increases.

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