



*Original Research*

**Effect of *Berberis aristata* Root Powder - A Herbal Feed Additive- on Production Performance and Carcass Quality of Broiler Birds**

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**Abstract**

The experiment was conducted on 195 unsexed Vencobb100 broiler chicks of similar weight in randomized block design (RBD). There were 5 treatments with 3 replications, 39 of 13 birds in each. The experimental diets were T1 (Basal ration), T2 (Basal ration + Antibiotic (Coltin -1 g/kg), T3 (Basal ration + *Berberis aristata* root powder @ 0.4 %), T4 (Basal ration + *Berberis aristata* root powder @ 0.5 %) and T5 (Basal ration + *Berberis aristata* root powder @ 0.6 %). There was no significant (>0.05) different among the average initial body weight, final body weight, body weight gain, feed consumption, feed cost/Kg in dollar, and cost of feed to produce one Kg live body weight. But the mortality percent was found highest in control group whereas no mortality rate were recorded in rest of the group. Significant difference (P<0.05) in carcass trait was found with lungs, wing piece and abdominal fat of male carcasses whereas no significant differences were found in female carcass. Lowest cost of production for one kg live body weight was found with feed fed with T3 i.e., 0.4% of *Berberis aristata* root powder in a basal diet.

**Key words:** Broiler, *Berberis aristata*, Carcass, Root Powder, Weight Gain

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**Introduction**

*Berberis aristata* called as chutro in Nepal, has been well documented as a useful medicinal plant using its stem and roots. *Berberis lycium* added to feed at 20 g per kg is effective in improving immunity against New castle and infectious bronchitis disease as well as liver function in broiler chicks Chand *et al.* (2011). Average body weights were significantly (P< 0.05) heavier when diet containing 1% root powder of *B. vulgaris* was compared with the birds without it Rajaian *et al.* (2006). In broiler feeding *B. lycium* at a level



of 2% of total feed, has been reported to improve weight gain, feed efficiency and reduce mortality Chand (2005). Berberine extracts have significant antimicrobial activity against a different organisms i.e., bacteria, viruses, fungi, protozoans, and helminthes (Hong *et al.*, 2000). Thus, this research was conducted with the aim to improve performance with economic production and to find an alternative of antibiotic because of its haphazard use, resistance of pathogens against it and its residual effect in humans as well as in poultry.

### Materials and Methods

The experiment was conducted for a period of 42 days after 9 days of brooding on 195 unsexed Vencobb 100 broiler chicks of similar weight. It was set on randomized block design (RBD). There were 5 treatments with 3 replications, 39 birds in each group i.e. total 195 chicks with 13 in each treatment. All the chicks were provided with uniform floor, standard management throughout the experimental period. Feed and water were provided *ad libitum* during the entire experimental period. Birds were fed in 2 phase, grower ration from 1<sup>st</sup> to 3<sup>rd</sup> week first phase and finisher ration from 4<sup>th</sup> to 5<sup>th</sup> week second phase.

The experimental diets were formulated according to the standard perceived by Vencobb broiler management guide. The *B. aristata* root was collected from nearby forest and was washed with water and dried in sun, chopped and made powder by grinding. Treatments were T1 (Basal ration), T2 (Basal ration + Antibiotic (Coltin -1 g/kg), T3 (Basal ration + *B. aristata* root powder @ 0.4 %), T4 (Basal ration + *B. aristata* root powder @ 0.5) and T5 (Basal ration + *B. aristata* root powder @ 0.6 %). Carcass characteristics were studied at the 6<sup>th</sup> weeks. Data on initial body weight, final body weight, body weight gain and feed consumption were recorded on weekly basis whereas morality at the end of experiment. Each male and female i.e. 30 broiler (2 male and 2 female form each treatment were slaughter after 9 hours of fasting by cutting jugular vein. Skin and feather were removed, dressing percent and their relative body parts were weight and recorded.

**Table 1.** Ingredient composition (% DM) of experimental diets

Feed Ingredient in (kg)	Starter Ration	Grower Ration	Finisher Ration
Maize	41.4	62.5	49.57
RP	14.6	9.7	14.2
Soya	33	20	24.2
FM	7	4.64	6.4
Molases	2	1.36	3.67
L/St	1	0.68	0.85
Methionine	0	0.12	0.11
Mineral mix	1	1	1
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>

Salt 350 g/100kg of diet, each kg of concentrate contain Vit A, 100000 I.U.; Vit D<sub>3</sub>, 33000 I.U.; Vit E, 100 mg; Vit K<sub>3</sub> 25 mg; Vit B<sub>1</sub> 10 mg; Vit B<sub>2</sub> 50 mg; Vit B<sub>6</sub> 15 mg; Vit B<sub>12</sub> 20 0µg; Niacin, 400 mg; Pantothenic acid, 100 mg; Folic acid 10 mg; Choline chloride, 8323 mg; Biotin 500 µg; Iodine 3mg, Iron 450 mg; Manganese 800 mg; Zinc 600mg, and selenium, 1mg, Cobalt 1 mg and antioxidant 7.5 mg

Dry matter percent of meat from each treatment and replication was determined by keeping fresh sample in the oven dry at the temperature of 100 °C till its constant weight. It was calculated by dividing oven dry sample by fresh sample and multiplying by 100. Analysis was done by using software IBM SPSS statistics 20. The ingredients and nutrient composition of the experimental broiler ration is presented in Table 1.

## Results and Discussion

### Overall Performance

Live weight gain, average daily gain, average daily feed intake, feed conversion ratio, mortality percentage and cost at 42 days is presented in Table 2.

**Table 2:** Effect of feeding (*Berberis aristata*) root powder supplemented diet on live weight gain, average daily gain, average daily feed intake, feed conversion ratio, mortality percentage and cost at 42 days

Parameter	Dietary Treatments					SEM	P-value
	T1	T2	T3	T4	T5		
Initial body weight	161.54	163.08	163.33	161.03	160.26	2.391	0.996
Final body weight	2348.76	2388.02	2395.6	2386.79	2374.97	24.826	0.987
Total weight gain	2187.22	2224.94	2232.27	2225.76	2214.72	23.778	0.986
Total feed intake	3956.66	3949.02	3941.83	3962.95	3994.07	29.688	0.99
Feed conversion ratio	1.82	1.78	1.77	1.78	1.81	0.028	0.984
Feed cost /Kg \$	0.5	0.525	0.515	0.519	0.523		
Cost to produce/kg Live weight in \$	0.91	0.93	0.91	0.92	0.94	0.015	0.139
Mortality %	15%	0	0	0	0		

There was no significant ( $P > 0.05$ ) different among the average initial body weight, final body weight, body weight gain, feed intake, feed cost/kg in dollar and cost of feed to produce one Kg live body weight. But the mortality percent was found highest in T1 23% whereas no mortality rate were recorded in rest of the treatment. Thus, results different with Rajaian *et al.* (2006) who reported average body weights were significantly ( $P < 0.05$ ) heavier when diet containing 1% root powder of *B. vulgaris* was compared with the birds without it. Chand (2005) reported that reduced mortality with treated group when compared with control which was similar with present finding in case of mortality.

### Carcass Characteristic

The average body weight, dress weight with giblet and without giblet, their body parts i.e. heart, liver, gizzard, intestine, lungs, kidney, head, shank, neck, chest, back, blood, feather and skin, gall bladder, leg piece and wing piece, abdominal fat and dry matter percent of female and male broiler chickens are presented respectively in Table 3 and Table 4.

**Table 3:** Effect of feeding (*Berberis aristata*) root powder supplemented diet on mean dressing percentage and relative organ weight of female broiler chickens at 42 days

Parameter	Treatments					SEM	P-value
	T1	T2	T3	T4	T5		
Body Wt. (g/bird)	2740	3150	2597	2887	2737	73.278	0.14
Dressed Wt. with giblet (%)	74	72.9	70.8	72.8	73.5	0.448	0.196
Dressed Wt without giblet (%)	68.9	68.4	65.1	67.6	68.4	0.511	0.113
<b>Weight of Giblet</b>							
Heart (g kg <sup>-1</sup> )	3.7	4.3	5.3	3.5	4.9	0.444	0.72
Liver (g kg <sup>-1</sup> )	17	15.9	20.3	16.1	17	0.599	0.115
Gizzard (g kg <sup>-1</sup> )	30.6	24.6	31.2	31.9	29.2	1.711	0.7
<b>Weight of Offal</b>							
Intestine (g kg <sup>-1</sup> )	53.3	46.8	67.7	53.5	64.6	2.907	0.102
Lungs (g kg <sup>-1</sup> )	3.7	3.5	3.4	2.9	3.9	0.195	0.592
Kidney (g kg <sup>-1</sup> )	4.3	4.5	3	4.2	3.8	0.207	0.142
Head (g kg <sup>-1</sup> )	19.5	18	20.6	18.3	18.2	0.559	0.611
Shank (g kg <sup>-1</sup> )	31.9	30.8	35.2	32.8	30.4	1.232	0.808
<b>Weight of Body</b>							
Neck (g kg <sup>-1</sup> )	34	25.5	33.3	29.1	27.9	1.348	0.21
Chest (g kg <sup>-1</sup> )	273.7	281.1	216.5	263.6	268.2	8.964	0.147
Back (g kg <sup>-1</sup> )	108.3	105	118.5	112.8	121.8	2.496	0.171
Wt. of blood (g kg <sup>-1</sup> )	70.4	49.1	29.6	20.7	23.7	7.169	0.124
Wt. of feather and skin (g kg <sup>-1</sup> )	98.4	100.6	102.9	102.9	102	1.368	0.865
Wt. of gall bladder (g kg <sup>-1</sup> )	1.2	1	1.9	1.2	1.6	0.129	0.147
Leg piece (g kg <sup>-1</sup> )	191.6	189.7	191.3	177.6	180.3	2.383	0.642
Wing piece (g kg <sup>-1</sup> )	69.4	64.5	73.1	66	65.9	1.51	0.411
Abdominal fat (g kg <sup>-1</sup> )	1.8	2.8	3	4.2	2.9	0.345	0.311
Spleen (g kg <sup>-1</sup> )	1.2	1	1.3	0.9	1.2	0.091	0.697
Dry matter (%)	30.74	29.26	34.58	32.42	30.85	0.744	0.202

No significant effect were found in heart, liver, gizzard, intestine, lungs, head, shank, blood, feather and skin, gall bladder, leg piece, wing piece, abdominal fat and dry matter percent of female broiler meat.

**Table 4:** Effect of feeding (*Berberis aristata*) root powder supplemented diet on mean dressing percentage and relative organ weight of male broiler chickens at 42 days

Parameter	Treatments					SEM	P-value
	T1	T2	T3	T4	T5		
Body Wt. (g/bird)	3000	2980	2597	3563	3183	114.911	0.081
Dressed Wt. with giblet (%)	70.9	72.5	70.8	73.7	72	0.641	0.654
Dressed Wt without giblet (%)	65.5	67.2	65.1	68.6	66.6	0.724	0.622
<b>Weight of Giblet</b>							
Heart (g kg <sup>-1</sup> )	5.5	4	5.3	5.6	4.1	0.44	0.681
Liver (g kg <sup>-1</sup> )	19	19.2	20.3	15.8	17.8	0.674	0.294
Gizzard (g kg <sup>-1</sup> )	29.5	30.6	31.2	29.1	31.4	1.001	0.953
Wt. of offal							
Intestine (g kg <sup>-1</sup> )	76.7	62.9	67.7	54.5	60.8	3.507	0.376
Lungs (g kg <sup>-1</sup> )	4.4 <sup>ab</sup>	4.5 <sup>ab</sup>	3.4 <sup>c</sup>	5.2 <sup>a</sup>	4.0 <sup>bc</sup>	0.189	0.011
Kidney (g kg <sup>-1</sup> )	4.1	4.3	3	4.1	3.2	0.31	0.634
Head (g kg <sup>-1</sup> )	21.2	24.7	20.6	26	25.1	1.049	0.381
Shank (g kg <sup>-1</sup> )	40.3	41.5	35.2	38.5	36.7	1.1	0.396
<b>Weight of Body</b>							
Neck (g kg <sup>-1</sup> )	29.9	32.6	33.3	33.6	27.2	1.228	0.466
Chest (g kg <sup>-1</sup> )	239.3	232.9	216.5	255	253.3	7.824	0.571
Back (g kg <sup>-1</sup> )	112.2	127.3	118.5	115.2	118.4	2.323	0.341
Wt. of blood (g kg <sup>-1</sup> )	31.1	31.6	29.6	27.4	34.6	1.091	0.334
Wt. of feather and skin (g kg <sup>-1</sup> )	106.6	105	117.2	96.4	103.7	2.803	0.223
Wt. of gall bladder (g kg <sup>-1</sup> )	2.1	1.7	1.9	2.5	2	0.103	0.093
Leg piece (g kg <sup>-1</sup> )	199.9	197	191.3	206.6	193.7	3.128	0.641
Wing piece (g kg <sup>-1</sup> )	65.5 <sup>bc</sup>	66.2 <sup>bc</sup>	73.1 <sup>a</sup>	70.9 <sup>ab</sup>	64.9 <sup>c</sup>	1.076	0.021
Abdominal fat%	1.2 <sup>ab</sup>	2.4 <sup>ab</sup>	3.0 <sup>a</sup>	0.7 <sup>b</sup>	1.3 <sup>ab</sup>	0.305	0.048
Spleen (g kg <sup>-1</sup> )	1	0.9	1.3	1.3	1	0.091	0.72
Testicles (g kg <sup>-1</sup> )	0.4	0.8	0.8	0.7	0.4	0.086	0.517
Dry matter%	28.81	31.96	30.34	27.72	27.74	0.737	0.317

Mean within in each row with no common superscript are significantly different (P<0.05)

Significant difference (P<0.05) was found in lungs, wing piece and abdominal fat of male broiler. Mean lungs weight of T4 5.2 g was found significantly higher (P<0.05) than T3 3.4 g and T5 4.0 g but at par with T2 4.5 g and T1 4.4 g. Mean weight of wing piece of treatment T3 73.1 g was recorded significantly (P<0.05) higher over T1 65.5 g, T2 66.2 g and T5 64.9 g whereas similar with T4 70.9 g. Mean abdominal fat percentage was recorded lowest with T4 0.7% whereas highest recorded in T3 3.0% followed by T2 2.4%, T5 1.3% and T1 1.2%. No significant difference were found among average body weight, dress weight with giblet and without giblet, liver, gizzard, intestine, kidney, head, shank, neck, chest, back, blood, feather and skin, gall bladder, leg piece, testicles and dry matter of male broiler.

**Conclusion**

Lowest body weight gain, poor feed conversion ratio and highest mortality percentage was found in T1 group when compared with diet supplemented with antibiotics and *B. aristata* root powder in spite of non-



significant differences. Furthermore, cost of feed to produce 1kg live body weight was higher with T2 antibiotics group due to its high cost when compared with diet supplemented with 0.4% of *B. aristata* root powder. Thus, there is no need to add 0.5% and 0.6% *B. aristata* root powder in the basal diet because with the addition of 0.4% we can found better result for economic cost and no mortality as in the T2 group.

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