

Research Article

Efficacy of Kalo Jeera seeds (*Nigella sativa*) and Thankuni (*Centella asiatica*) supplementation on the growth performance of broiler chicken

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ABSTRACT

Background: In modern era, treatment methods become diversified and developed day by day and organic medicine is one of the modern technology which also introduced in our poultry sector. This experiment was conducted to evaluate the efficacy of Thankuni (*Centella asiatica*) and Kalo Jeera (*Nigella sativa*) powdered supplementation as a growth promoter in broiler chickens.

Methods: A total of 20 day-old Cobb 500 broiler chicks were randomly divided into two groups, A and B after seven days of acclimatization. The group A was kept as control and fed on only normal balanced diet. The group B was treatment group fed on normal diet with additional supplementation of Thankuni and Kalo Jeera powder in water. For observation of growth rate, live body weight was taken at first day and every seven days interval up to 5th weeks. Besides it hematological tests were performed at 35th days for searching hematological changes in both groups.

Results: The initial body weight of groups A and B on 1st day of this experiment were 43.00 ± 0.56 gm and 42.50 ± 0.35 gm, respectively and after 35th day of experiment final body weight were 1450 ± 57.35 gm and 1700 ± 58.56 gm ($p < 1\%$) respectively. The growth rate of treatment group B was 17.24% more ($p < 1\%$) than that of control birds. Although the dressing percentage of both group was equal but relative weight of heart, liver, spleen and pancreas were significantly higher ($p < 0.1$) in treatment group indicates better flock health. Feed Conversion Ratio (FCR) were 1.88 in treated birds and 2.28 in control birds was the sign of economy rate of production and were analyzed and found that net profit per broiler was Tk. 10.50 (0.12 USD) and Tk. 33.00 (0.4 USD), respectively. General blood parameters of treatment group were non-significantly higher than control group.

Conclusions: The results suggest that better growth performance were achieved in broilers supplemented with Thankuni leaf and Kalo Jeera. Both of these two herbal medicines have antimicrobial, immunostimulatory, anti-stress, fungi static, insecticidal and liver tonic properties so that there were no mortality rate. Now it can be said that uses of Thankuni and Kalo Jeera has beneficiary effects in broiler production.

Keywords: Thankuni, Kalo Jeera, Broiler, Body weight, Profit

INTRODUCTION

Many countries have strict law against using of antibiotics and feed additives as growth promoter in

poultry diets due to its residual effect on human body and bacteria develop resistance to those drugs thus producing many new diseases.¹ Researchers are now trying to give emphasis on natural plant extract in exchange of

antibiotics for the control of diseases and better performance of growing birds.^{2,3} Among various medicinal plants, *Nigella sativa* (*N. sativa*) (Family Ranunculaceae) is emerging as a miracle herb. *N. sativa* is commonly known as black seed. *N. sativa* is native to Southern Europe, North Africa and Southwest Asia and it is cultivated in many countries in the world like Middle Eastern Mediterranean region, South Europe, India, Pakistan, Syria, Turkey, Saudi Arabia.^{4,5} *N. sativa* has been extensively studied for its biological activities and therapeutic potential and shown to possess wide spectrum of activities *viz.* as diuretic, antihypertensive, antidiabetic, anticancer and immunomodulatory, analgesic, antimicrobial, anthelmintic, analgesics and anti-inflammatory, spasmolytic, bronchodilator, gastro protective, hepato protective, renal protective and antioxidant properties.⁶ Most of the therapeutic properties of this plant are due to the presence of thymoquinone, thymol and carvacol.^{4,7,8} Triterpenoid and saponins, the primary constituents of *Centella asiatica* are mainly believed to be responsible for wide therapeutic activities. Apart from wound healing, the herb is recommended for the treatment of various skin conditions such as leprosy, lupus, varicose ulcers, eczema, psoriasis, diarrhoea, fever, amenorrhoea, diseases of the female genitourinary tract and also for relieving anxiety and improving cognition.^{9,10} Bangladesh is a densely populated country where demand of protein of this booming population is a great threat. Each person should take 56 kg of meat and 365 eggs every year. But in Bangladesh, per head intake of meat is only 11.27 kg and 30 eggs per year.¹¹ Broiler production has grown dramatically in the past two decades; for achieving the maximum expression of their genetic potential poultry farmers make use of synthetic growth promoters.¹² Many of these growth promoters are supplemented to broiler diets to gain rapid growth, but their use have shown many disadvantages like high cost, adverse side effect on health of birds and long residual properties and carcinogenic effect in humans.¹³ So, researchers are now concentrating efforts on the use of beneficial herbs and plants, which can be safely used to increase production and also contains pharmacologically-active substances and are known to produce certain chemicals that are naturally toxic to bacteria.¹⁴ In view of these, this work has been undertaken to investigate the growth performance of broilers through supplementation of Thankuni and Kalo Jeera and examine the effect of Thankuni and Kalo Jeera on blood parameters (TEC, ESR and Hb) of broilers.

METHODS

This study was executed at the Department of Pharmacology, Bangladesh Agricultural University (BAU), Mymensingh; during the period from 26th July, 2014 to 5th October, 2014. The experimental units were kept on a floor litter system in separate pens each measuring 3 x 4 square feet. A total of 20 day-old Cobb 500 broiler chicks purchased from a local hatchery (Nourish Poultry & Hatchery Ltd.) were randomly

divided into 2 groups (A and B) after seven days of acclimation. All the birds were provided same management conditions like floor space, temperature, relative humidity, ventilation and light. Young, fresh & green Thankuni leaves were harvested, washed, chopped and air dried in a well-ventilated room for 10 days. The dried leaves were ground using the Mixture blender to produce Thankuni powder. Kalo Jeera seeds were purchased from local market, BAU, and Mymensingh, washed and dried and crushed in mortar pestle to paste. Treatment group B fed on balanced diet with mixture of Thankuni and Kalo Jeera (1% each in drinking water). All the chicks were closely observed for 35 days. Mean live weight gains of each group were recorded on 1st, 7th, 14th, 21st, 28th and 35th days. Blood samples were collected from wing vein of chicken of both control and treated groups at 35th day. Total Erythrocyte Count (TEC), hemoglobin concentrations (Hb), Erythrocyte Sedimentation Rate (ESR) was done following the method described by Lamberg and Rothstein.¹¹ After postmortem of birds, liver, spleen, heart, pancreas, and gizzard of 5 birds from each group was collected and then measured by air tight electric balance. The dressing percentage was also evaluated by comparing between live and carcass body weight. During the 35 days of experimental period, growth performance was evaluated and mortality was recorded throughout the study.



Figure 1: Treatment group of broiler.



Figure 2: Control group of broiler.

RESULTS

Body weight of broilers and FCR

The experiment was conducted according to the completely randomized design and data about per

replicate body wt., weekly body wt., weekly feed consumptions and mortality were recorded throughout the experimental period (1-5 weeks of age). The birds were supplied Thankuni and Kalo Jeera by using drinking water in B Group and gained the higher live weight which is shown in Table 1. In control group (Group A) initial

average live weight on 1st day was 42.10 ± 0.56 gm, final live weight 1442 ± 37.35 gm, weight gain 1400 ± 43.79 gm and Feed Conversion Ratio (FCR) was 2.28 (Table 2). In Group B initial average live weight on 1st day was 41.50 ± 0.35 gm, final live weight 1700 ± 58.56 gm, weight gain 1657.50 ± 54.25 gm and FCR 1.88 (Table 2).

Table 1: Body weight of broilers and FCR.

Body wt. (g)	Day 1 Mean ± SD	Day 7 Mean ± SD	Day 14 Mean ± SD	Day 21 Mean ± SD	Day 28 Mean ± SD	Day 35 Mean ± SD
Control (n=10)	42.20 ± 2.80	158.54 ± 4.80	550.89 ± 8.90	935.70 ± 10.90	1375 ± 18.00	1442 ± 32.00
Treatmet (n=10)	41.50 ± 3.84	173.90 ± 5.67	607.79 ± 21.08	1045 ± 16.90	1560 ± 43.09	1700.98 ± 45.89
% increase	0	10.10	10.23	11.22	13.45	17.89

% body weight gain = (T-C) X100/C, Where, C means Control & T means Treatment

Table 2: Statistical analysis: Body weight of broilers and FCR.

Variables	Treatments	Average weight (Mean ± SEM)	p value	Significance level
Initial live weight (g) on 1 th day	Control	42.20 ± 2.56	0.000	**
	Thankuni and Kalo Jeera	41.50 ± 3.35		
Final live weight (g) on 35 th day	Control	1442 ± 45.35	0.000	**
	Thankuni and Kalo Jeera	1700.00 ± 48.56		
Weight gain (g)	Control	1400 ± 43.79	0.000	**
	Thankuni and Kalo Jeera	1657.5 ± 54.25		
Feed consumption (g)	Control	3200 ± 35.49	0.000	**
	Thankuni and Kalo Jeera	3200 ± 52.29		
FCR	Control	2.28		
	Thankuni and Kalo Jeera	1.88		

Dressing percentages, relative giblet weight (heart, gizzard, liver and spleen) and pancreas weight of broilers supplemented with or without Thankuni and Kalo Jeera from 1-5 weeks of age

Dressing percentage is slightly increased in treated groups than in control. Relatively each organ weight had increased in treated ones except gizzard weight which is slightly decreased in Thankuni and Kalo Jeera treated groups than the control (Table 3). Statistical analysis of the data shows non-significant between the dressing percentages of the birds of two groups (Table 3). Statistical analysis of the data did not show any difference between the relative gizzard weights of the birds of two groups (Table 2). Statistical analysis of the data shows 1% level of significance of relative heart, liver, spleen and pancreas weight between the birds of two groups using drinking water with or without supplementation of Thankuni and Kalo Jeera (Table 2).

Economies of production

The average rearing cost of broilers in two groups were Tk. 178.00 and Tk. 188.00 for A and B Groups

respectively excluding the cost of labour. Miscellaneous cost summed up Tk. 20 per broiler, which included the estimated cost of electricity, litter and disinfectant. The average live weight/broiler in Groups A and B were 1.442 kg and 1.700 kg respectively. The broilers were sold in live weight basis at the rate of Tk. 130/kg. The net profit/kg live weight in the respective group excluding the cost of labour was found to be Tk. 6.60 and Tk. 19.41 respectively (Table 4).

Effects of Thankuni and Kalo Jeera on hematological parameters of broiler

Observation of hematological parameter (RBC, Hb and ESR) on 35th day did not show any significant difference (p<0.05) between the control and Thankuni and Kalo Jeera treated groups (Table 5). Total Erythrocyte Count (TEC) in control group was 2.01 ± 0.102 million/μl and 2.11 ± 0.23 million/μl in Group B. ESR was little bit higher in Group B (4.83 ± 0.64 mm in first our) than control bird. Hemoglobin level was 7.10 ± 0.13 gm/dl 7.35 ± 0.13 gm/dl in control and treatment group respectively.

Table 3: Dressing percentages, relative gilet weight (heart, gizzard, liver and spleen) and pancreas weight of broilers supplemented with or without Thankuni and Kalo Jeera from 1-5 weeks of age.

Variables	Treatments	Average value (Mean \pm SEM)	p value	Significance level
Dressing percentage	Control	64.410 \pm 0.414	0.939	NS
	Thankuni and Kalo Jeera	64.470 \pm 0.961		
Relative heart weight	Control	0.420 \pm 0.032	0.002	**
	Thankuni and Kalo Jeera	0.501 \pm 0.032		
Relative gizzard weight	Control	1.460 \pm 0.034	0.606	NS
	Thankuni and Kalo Jeera	1.440 \pm 0.014		
Relative liver weight	Control	2.530 \pm 0.034	0.001	**
	Thankuni and Kalo Jeera	2.610 \pm 0.032		
Relative spleen weight	Control	0.120 \pm 0.011	0.011	**
	Thankuni and Kalo Jeera	0.130 \pm 0.015		
Relative pancreas weight	Control	0.230 \pm 0.011	0.001	**
	Thankuni and Kalo Jeera	0.250 \pm 0.017		

** = Significant at 1% level of probability (0.00-0.01), NS = Not significant (\geq 0.05), Relative weight (g) = Weight of organ/Live body weight of bird x 100, Dressing % = Dress weight of bird/Live weight of bird

Table 4: Economies of production.

Description	Group-A	Group-B
Cost/chick (Taka)	30.00	30.00
Average feed consumed (kg)/chicks	3.200	3.200
Feed price/kg (Taka)	40.00	40.00
Cost of herbal growth promoters (Taka)	0.00	10.00
Feed cost (Taka)	128.00	128.00
Miscellaneous (Taka)	20.00	20.00
Total cost/broiler (Taka)	178.00	188.00
Average live weight (kg)	1.442	1.700
Sale price/kg live wt. (Taka)	130.00	130.00
Sale price/broiler (Taka)	187.50	221.00
Net profit/broiler (Taka)	9.50	33.00

Table 5: Effects of Thankuni and Kalo Jeera on hematological parameters of broiler.

Group	TEC (million/ μ l)	ESR (mm in first hour)	Hb (gm/dl)
Control	2.01 \pm 0.102	4.60 \pm 0.58	7.10 \pm 0.13
Treatment	2.11 \pm 0.23	4.83 \pm 0.64	7.35 \pm 0.13
p value	-	-	-
Level of sig.	NS	NS	NS

DISCUSSION

Addition of herbal growth promoter Thankuni and Kalo Jeera improved the weight gain of the broilers. The values for liver, heart, gizzard and lungs did not differ significantly, this could be linked to the absence of anti-nutritional factors in the diets. The birds had been drunken water supplemented with herbal growth promoters Thankuni and Kalo Jeera utilized their feed

more efficiently than those supplied drinking water without addition of the growth promoters.¹⁵ The use of Thankuni and Kalo Jeera with drinking water showed more increase in live weight of the birds as compared to control group in this study.¹⁵ While supplementation of Thankuni and Kalo Jeera did not exhibit any effect on the dressing percentage values of the broilers but use of various levels of herbal growth promoters in the rations exhibited an increase in the profit margin of the broilers as compared to those using ration without the addition of these growth promoters. Supplementation of 1% Thankuni and Kalo Jeera with drinking water was found to be more profitable than without garlic supplementation in broiler rearing.¹⁶ General blood parameters of both treated and control birds were near about equal which indicates that there were no extraordinary side effects of these two extracts on normal physiology. But in case of treated broiler, birds show somewhat improvement of blood parameters which may be responsible for more nutrients transportation.¹⁷

CONCLUSION

This study has revealed that there is a positive relationship between supplementation of Thankuni and Kalo Jeera and on the body weight gain significantly (at 1% level) increases. The hematological parameter TEC, ESR and PCV value of treatment group showed non-significant difference between the treatment and control groups of broilers. No mortality was observed in broiler during experimentation because of antimicrobial, immunostimulatory, anti-stress, fungi static, insecticidal and liver tonic properties and activities of those two herbal medicines. Thereby, these are helpful in treating many serious systemic diseases, as well as localized infections. Now it is the need of the hour to work more extensively on the medicinal plants in the greater interest

of mankind to protect human being from irrational use of antibiotics and antimicrobial growth promoters.

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Ethical approval: The study was approved by the institutional animal ethics committee

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