



Effects of Neem, Nishyinda and Papaya leaves as growth promoters in broiler chicks

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ABSTRACT

The experiment was conducted to evaluate the efficacy of Neem (*Azadirachta indica*), Nishyinda (*Vitex nogundo*) and Papaya (*Carica papaya*) leaves powdered supplementation in drinking water as a growth promoter in broiler chicks. A total of 40 day-old Cobb 500 broiler chicks were purchased from local hatchery (Nourish Poultry & Hatchery Ltd.) and after seven days of acclimatization chicks were randomly divided into two groups, A and B. The group A was kept as a control and not treated. The group B was supplemented with Neem, Nishyinda and Papaya dried leaves powder with feed and water. Weekly observations were recorded for live body weight gain up to 6th weeks and hematological tests were performed at 17th and 35th day's age of broiler to observe hematological changes between control (A) and treatment (B) groups. The initial body weight of groups A and B on 7th day of this experiment were 140±3.56 gm and 140±4.35 gm, respectively and after 35th day of experiment final body weight were 1450±47.35 gm and 1650±58.56 gm, respectively; the net body weight gain were 1310±43.79 gm and 1510±54.25 gm, respectively and economics of production were analyzed and found that net profit per broiler was Tk. 24.21 and Tk. 34.78, respectively. The body weight was significantly increased (p<0.01) in treatment group compared to control group A. The TEC, ESR and PCV value of treatment group showed significant difference (P<.05), while Hb estimation did not show significant difference in control group. The results suggest that better growth performance could be achieved in broilers supplemented with Neem, Nishyinda and Papaya extract.

Key words: Neem, Nishyinda, Papaya, leaf extract, growth promoter, broiler.

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INTRODUCTION

Poultry industry is a promising sector in Bangladesh. Poultry farming offers opportunities for fulltime or part-time employment, particularly for women, children or elderly person in the farm operations. Moreover, from the poultry industry biogas and organic fertilizer can be prepared. Bangladesh is a densely populated country and growth of population is increasing very fast in

comparison to its land size, as a result huge pressure is created on people's basic need. Demand of protein of this booming population is a great threat for us. There are so many sources of protein but it is not possible to fulfill the demand without broiler. Because the duration of broiler rearing is very short and within 36-42 days it is ready for marketing and suitable for human consumption. It also brings very short time return

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to farmer. Broilers meat is popular to all of us and there is no religious restriction to consume.

According to our socio-economic situation, the knowledge of our farmer is very little because most of them are not properly trained for broilers production, but unemployed young generation is coming in this business for short return of value and profit. Pharmaceutical companies take this advantage. They are convincing farmers for using antibiotics as a growth promoter or life savings for chicken. As a result, each and every broiler is a depot of antibiotics. When these broilers are consumed by human this antibiotic residue enters into human body and causing serious human health hazards with drug residues.

Due to the prohibition of most of antimicrobial growth promoters (AGP), plant extracts have gained interest in animal feed strategies (Charis, 2000). The risk of the presence of antibiotic residues in milk and meat and their harmful effects on human health have led to their prohibition for use in animal feed in the European Union (Cardozo et al., 2004). Feed additives are added to the ration with the purpose of obtaining some special effects. The main objective of adding feed additives is to boost animal performance by increasing their growth rate, better-feed conversion efficiency, greater livability and lowered mortality in poultry birds. These feed additives are termed as “growth promoters” and often called as non-nutrient feed additives. Many synthetic drugs and growth promoters are supplemented to the broilers to effect rapid growth, but their use have shown many disadvantages like high cost, adverse side effect on health of birds and long residual properties etc. Consequently there is considerable research interest in the possible use of natural products, such as essential oils and extracts of edible and medicinal plants, herbs and spices, for the development of new additives in animal and poultry feeding. So, scientists are again concentrating on the use of our ancient medicinal system to find beneficial herbs and plants, which can be safely used to increase the production.

It is conceivable that herbal agents could serve as safer alternatives as growth promoters due to their suitability and preference, lower cost of

production, reduced risks toxicity and minimum health hazards. Interestingly recent biological trials of certain herbal formulations as growth have shown encouraging results and some of the reports have demonstrated improvement with respect to weight gain, feed efficiency, lowered mortality, increased immunity and increased livability in poultry birds (Kumar, 1991). Also these herbal growth promoters have shown to exert therapeutic Effects against liver damage due to feed contaminants like aflatoxin (Ghosh, 1992).

Various herbal products are being used as growth promoters in the poultry rations like garlic (Ahmad, 2005). Medicinal plants are cheap and renewable sources of pharmacologically-active substances and are known to produce certain chemicals that are naturally toxic to bacteria (Basile et al., 1999). Neem tree as one of the most researched tree in the world has attracted world-wide prominence due to its vast range of medicinal properties like antibacterial, antiviral, antifungal, antiprotozoal, hepatoprotective and various other properties without showing any adverse effects (Kale et al., 2003) while pawpaw leaves are rich source of the proteolytic enzymes papain and chymopapain (Poulter and Caygill 1985) which have protein digesting properties and are useful in controlling digestive problems and intestinal worms (Burkhill, 1985). Due to adverse side effects arising from the use of synthetic forms of growth promoters, consideration should be given to alternative natural supplements. Neem and papaya leaves (*Azadirachta indica*, and *Carica papaya*) have been found to be rich source of active ingredients essential to the growth of farm animals. Also, they are relatively abundant. This study hereby investigates the combined effect of neem and papaya leaves supplementation on the performance and carcass characteristics of broilers.

Herbal agents could serve as safer alternatives as growth promoters due to lower cost, reduced toxicity and minimum health hazards. Biological trials of certain herbal formulations as growth promoter have shown encouraging results and some of the reports have demonstrated improved weight gain and feed efficiency, lowered mortality, and increased immunity and viability in poultry (Kumar, 1991). Some herbal growth

promoters exert therapeutic effects against liver damage due to feed contaminants like aflatoxin (Ghosh, 1992). Polyherbal products promote growth and feed efficiency of birds because of their antibacterial and hepatoprotective properties (Wankar, 2009).

Nishyinda (*Vitex negundo* L.) is a hardy plant, flourishing mainly in the Indian subcontinent. It possesses phyto-chemical secondary metabolites, which impart a variety of medicinal uses. The leaves of Nishyinda may be applied locally to swellings from rheumatoid arthritis and sprains. The juice of the leaves is used for the treatment of foetid discharges. The principal constituents of the leaf juice are casticin, isoorientin, chrysophenol D, luteolin, p-hydroxybenzoic acid and D-fructose.

Carica papaya (Family Caricaceae) originated in Central America. Two important compounds are chymopapain and papain, which are supposed to aid in digestion. Papain also is used to treat arthritis. With the exception of infertility, the literature reviewed did not indicate any adverse reactions from the consumption of *Carica papaya* fruit, latex, or extracts. Considering the biological and pharmacological activities of Neem, Nishyinda and Papaya leaf, the present work has been undertaken to investigate the growth performance of broilers supplemented with these plant leaves and to examine their effects on hematological parameters of broilers.

MATERIALS AND METHODS

This study was executed at the Department of Pharmacology, Bangladesh Agricultural University (BAU), Mymensingh; during the period from 26th July, 2013 to 5th November, 2013.

Management of experimental birds

A total of 40, day-old Cobb 500 broiler chicks purchased from a local hatchery (Nourish Poultry & Hatchery Ltd.) and reared in experimental shed of Department of Pharmacology. Then the broiler chicks were reared carefully. All the birds were provided same management conditions like floor space, temperature, relative humidity, ventilation and light. Immediately after enter into the shed all

chicks were given vitamin-C and glucose to prevent the stress for transportation.

The broiler chicks were kept in the same compartment for 7 days and brooding temperature were correctly maintained. Optimum light was provided daily throughout the study period. The chicks were brooded at 35°C during first week and thereafter; the temperature was reduced by 3°C every week until the temperature reached to the room temperature i.e., 25±1°C. A weighed amount of the ration was offered to the birds twice a day and the left over feed was collected to calculate feed consumption of the birds.

Collection and processing of Neem, Nishyinda and Papaya

Young, fresh and blooming Neem, Nishyinda and Papaya leaves were collected green from the Bangladesh Agricultural University, Pharmacology medicinal plants garden, the leaves were washed, chopped and air dried separately in a well ventilated room for 10 days. The dried leaves were ground separately using the Mixture blender to produce Neem Leaf Meal (NLM) Papaya Leaf Meal (PLM) and Nishyinda Leaf Meal (NILM) and stored in air-tight bags.

Study Design

After 7 days all the 40 broiler chicks were randomly divided into 2 groups (A and B) for assessing the effect of Neem, Nishyinda and Papaya leaf powder as growth promoter on broilers. Treatment group B- Basal diet + mixture of Neem, Nishyinda and Papaya leaf meal (2.0kg per 100kg diet). All the chicks of treated and control groups were closely observed for 42 days and following parameters were studied.

Clinical examination

The Effect of Neem, Nishyinda and Papaya leaf on body weight of broilers was recorded before and after treatment. Mean live weight gains of each group of chicken on 7th and 42nd days were recorded.

Hematological examination

Blood samples were collected from wing vein of chicken of both control and treated groups at 17th and 35th days to study the effect Neem, Nishyinda and Papaya leaf and the Total Erythrocyte Count (TEC), Hemoglobin Estimation (Hb), Packed Cell Volume (PCV) and Erythrocyte Sedimentation Rate (ESR) was determined according to the method described by Lamberg and Rothstein (1977).

RESULTS AND DISCUSSION

Effect on growth of broilers:

The effect of Neem, Nishyinda and Papaya leaf on body weight of broiler is present in Table 1. The body weight gains were found higher in treated group compared to non treated control group. The data revealed that, in control group initial average live weight on 7th day was 140±3.7 gm, final live weight 1450± 46.35 gm, weight gain 1310± 33.79 gm and feed conversion ratio (FCR) was 2.17. Whereas in treated group initial average live weight on 7th day was 140±4.3 gm, final live weight 1650±48.56 gm, weight gain 1510± 44.25 gm and FCR 1.82.

Non significant differences between the dressing percentages of the birds of two groups (treated and control) were observed (Table 2). The relative gizzard weights of the birds of two groups was also non significant. However significant differences were observed in weight gain of heart, liver, spleen and pancreas between the the groups with or without supplementation of Neem, Nishyinda and Papaya leaf (Table 2).

Economies of Production

The average rearing cost of broilers were Tk. 169.70 and Tk. 173.60 for A and B groups respectively (Table 3), excluding the cost of labor because the experiment was conducted on the Department of Pharmacology research shed, Bangladesh Agricultural University, Mymensingh. 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 1.450 kg and 1.650 kg respectively. The broilers were sold in live weight basis at the rate of Tk. 140/kg. The net profit/Kg live weight in the respective group excluding the cost of labour was found to be Tk. 24.21 and Tk. 34.78 respectively.

Table1
Effect of Neem, Nishyinda and Papaya on body weight of broiler.

Variables	Treatments	Average weight (Mean ± SEM)
Initial live weight (g) on 7th day	Control	140 ± 3.70
	Neem,Nishyinda and Papaya	140 ± 4.30**
Final live weight (g) on 42nd day	Control	1450 ± 46.35
	Neem,Nishyinda and Papaya	1650 ± 48.56**
Weight gain (g)	Control	1310 ± 33.79
	Neem,Nishyinda and Papaya	1510 ± 44.25**
Feed consumption (g)	Control	3150 ± 45.49
	Neem,Nishyinda and Papaya	3000 ± 42.29**
FCR	Control	2.17
	Neem,Nishyinda and Papaya	1.82

**significant (p<0.01)

Table 2

Effect of Neem, Nishyinda and Papaya on body weight of broiler on dressing percentages, and relative weight gain of individual organ of broiler.

Variables	Treatments	Average value (Mean \pm SEM)
Dressing percentage	Control	64.400 \pm 0.404
	Neem,Nishyinda and Papaya	64.470 \pm 0.961
Relative heart weight	Control	0.420 \pm 0.032
	Neem,Nishyinda and Papaya	0.511 \pm 0.032**
Relative gizzard weight	Control	1.460 \pm 0.034
	Neem,Nishyinda and Papaya	1.440 \pm 0.014
Relative liver weight	Control	2.530 \pm 0.034
	Neem,Nishyinda and Papaya	2.610 \pm 0.032**
Relative spleen weight	Control	0.120 \pm 0.011
	Neem,Nishyinda and Papaya	0.130 \pm 0.015**
Relative pancreas weight	Control	0.230 \pm 0.011
	Neem,Nishyinda and Papaya	0.250 \pm 0.017**

**Significant $p < 0.05$)

Table 3

Cost-benefit analysis of broiler production by using feed supplemented with Neem, Nishyinda and Papaya.

Description	Group-A	Group-B
Cost/chick (Taka)	30.00	30.00
Average feed consumed (Kg)/chicks	3.100	3.200
Feed price/kg (Taka)	38.00	38.00
Cost of herbal growth promoters (Taka)	0.00	2.00
Feed cost (Taka)	117.80	121.60
Miscellaneous (Taka)	20.00	20.00
Total cost/broiler (Taka)	167.80	173.60
Average live weight (Kg)	1.450	1.650
Sale price/Kg live wt. (Taka)	140.00	140.00
Sale price/broiler (Taka)	203.00	231.00
Net profit/broiler (Taka)	35.20	57.40
Profit/ Kg live weight (Taka)	24.21	34.78

Relative weight (g) = Weight of organ / Live body weight of bird X 100

Dressing % = Dress weight of bird / Live weight of bird

Effect on hematological parameters of broiler

Observation of hematological parameter (RBC, PCV, ESR) on 17th day and 35th day showed

significant difference ($P < 0.05$) between the control and Neem, Nishyinda and Papaya leaf treated groups while Hb did not show any significant different compared to control (Table 4).

Table 4
Effect of Neem, Nishyinda and papaya leaf on hematological parameters of broiler.

Days	Blood parameters	Treatments	Mean± SEM
17 th Days	TEC	Control	192.39±1.037
		Neem,Nishyinda and papaya leaf	199.29± 0.992**
	Hb	Control	6.00± 0.089
		Neem,Nishyinda and papaya leaf	6.37 ± 0.438
	PCV	Control	17.35± 0.599
		Neem,Nishyinda and papaya leaf	17.97± 0.456
ESR	Control	10.68± 0.316	
	Neem,Nishyinda and papaya leaf	8.78± 0.316**	
35 th Days	TEC	Control	247.67± 1.028
		Neem,Nishyinda and papaya leaf	298.39± 0.751**
	Hb	Control	6.92± 0.491
		Neem,Nishyinda and papaya leaf	7.79± 0.111
	PCV	Control	18.00± 0.134
		Neem,Nishyinda and papaya leaf	19.95± 0.022*
ESR	Control	7.40± 0.268	
	Neem,Nishyinda and papaya leaf	5.24 ± 0.554*	

** P <0.01, *P<0.05)

Supplementation of Neem, Nishyinda and Papaya leaf in poultry feed improved the weight gain of the broilers in this study. These results are in line with the findings of Meraj (1998), who reported that higher weight gain in broilers, drinking water supplemented with Neem, Nishyinda and Papaya. Similar findings were observed by Mahejabin et al., 2015 who reported that supplementation of neem, turmeric and papaya leaf extract in the treatment group caused improvement in the feed efficiency as compared to that of control group. The improved weight gain was evident by higher carcass value. . The values for liver, heart, gizzard and lungs did not differ significantly, this might be linked to the absence of anti-nutritional factors in the diets, because higher physiological activities by these organs is triggered by the presence of anti-nutritional factors and their concomitant effect. In conclusion, results of the present study showed that supplementation of diet with 3% Neem, Nishyinda and Papaya improve performance, feed utilization, dressing percentage and carcass yield. Therefore the combination of these plant leaves can serve as an effective replacement for chemical based growth promoters in broiler production.

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