

Effect of Supplementation of Amla (*Emblica officinalis*) on Growth Performance of Broilers

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Abstract: The present investigation was undertaken as "Effect of Supplementation of Amla (*Emblica officinalis*) on Growth Performance of Broilers" The study was conducted for 42 days, on 150 day old, Vencobb-400 broiler chicks, divided in to three groups (T₁, T₂ and T₃) having 50 birds in each groups. The T₁ birds were fed on a basal ration (Control). The T₂ birds were given 0.5% Amla Powder (AM) and T₃ birds were given 1% Amla Powder (AM) along with the basal ration. Body weight, weight gain, feed consumption, feed efficiency, dressing percentage and economic efficiency of the treatments were evaluated. The chicks in T₃ group (1% AM) attained higher body weight at 6th week (2304.53 g), weight gain (502.15), lower feed intake (3832.35 g) better cumulative feed efficiency (1.71), higher economic profit (14.10 Rs.). It is concluded that supplementation of 1% Amla Powder enhanced broiler growth and more economic returns without exhibiting any perceptible side effect.

Keywords: Growth, performance, amla, powder, broilers, supplementation.

INTRODUCTION

The medicinal properties of *Emblica officinalis* have been mentioned in the old Ayurvedic text such as Charaksanhita and Sushrutsanhita. In addition to this, 'amla' is having various properties like immunomodulating, antifungal, antibacterial, anabolic, antihepatotoxic, anti-inflammatory, hypolipidemic (Kiritkar and Basu, 1935). *Emblica officinalis* is also known as *Phyllanthus emblica* Linn. Amla fruit is useful in conjunctivitis, inflammation, dyspepsia, ulcerative stomatitis, gastrohelcosis, cough, diarrhoea, dysentery, diabetes, asthma, bronchitis, cephalgia, ophthalmopathy, colic, jaundice, emaciation, cardiac disorder, intermittent fever hepatopathy, haemorrhage, menorrhagia and skin diseases (Anjaria *et al.*, 2002).

Amla is a natural, efficacious, antioxidant with the richest natural source of Vitamin C. The fruit contains the highest amount of Vitamin C. Amla

has been used as a valuable ingredient of various medicines in India from time immemorial. Amla extract is prepared from fresh amla by a special process and it retains all the qualities of amla. This product is soluble in water, pale green to deep brown free flowing powder and contains more than 25% polyphenols. This rebuilds new tissues and increases the red blood cell count. During stress severe depletion of vitamin C takes place (North, 1984). Vitamin C exerts a stimulant action on the phagocytic activity of leukocytes, reticuloendothelial system and formation of antibodies.

Benefits of feeding amla fruit powder on broilers as feed supplement are as, possess antistress and antioxidant property, it promotes growth, Stimulate the immune system and Improves feed conversion efficiency. Herbal preparations are useful as growth promoters. Ban or time bound decline in use of antibiotic growth promoters

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provides good scope for other growth promoters including herbal preparations for their use. Lot of herbal preparations helps the birds to fight stress arising due to various reasons. Adaptogenic herbs like Ashwagandha, Tulsi, Amla, and Ginseng etc. are being used as anti-stress factors for long years in human and animal medicines with proven results (Ranade and Desai, 2005).

MATERIALS AND METHODS

The trial was conducted on 150 day old, VenCobb-400 broiler chicks, at the Post Graduate Institute of veterinary and animal sciences poultry farm Akola. Commercial straight run broiler chicks of Vencobb-400 strain were obtained from Khadkeshwar Hatcheries Pvt. Limited, Aurangabad (M.S.). The Amla Powder (AM) was procured from local market of Akola (M.S.) as feed additives for the conducting feeding trial on broilers.

The chicks were divided into three groups (T_1 , T_2 and T_3) having 50 birds in each group with four replications. The birds were kept under deep litter system. The T_1 birds were fed on a basal ration (Control). The T_2 birds were given 0.5% Amla Powder (AM) and T_3 birds were given 1% Amla Powder (AM) along with the basal ration. On arrival, chicks were weighed and distributed randomly in to three treatment groups *viz.*, T_1 , T_2 and T_3 with 50 chicks in each group, on equal weight basis.

Body weight and feed consumption were recorded at weekly interval up to 6th weeks of age. Feed conversion efficiency was estimated as amount (kg) of feed consumed for every kg gain in body weight. Performance efficiency (%) was calculated as the ratio of body weight (kg) and feed conversion efficiency (kg), multiplied by 100. Towards the end of trial, three birds from each group were randomly selected and slaughtered for the calculating dressing percentage. The economics of broiler production was worked out by considering the total cost of production which included the feed cost, chicks, labour, medicines, vaccines and the overhead costs. The data were analysed by standard statistical techniques (Snedecor and Cochran, 1989).

RESULTS AND DISCUSSION

Cumulative Body Weight

It is seen from the present results that the average live body weights of broilers at day old stage were 46.56, 46.64, and 46.58 g for the treatments T_1 , T_2 and T_3 groups, respectively. The corresponding average live body weights at the end of six weeks of age were 2178.01, 2246.74 and 2304.53 g in T_1 to T_3 treatment groups, respectively. The significant difference in weekly body weight was found from third week onward. The trend of significantly better growth was recorded in T_3 (2304.53) group during fourth to sixth week. This indicates beneficial effect of feeding AM (1%) at higher level than lower one (0.5%).

The present results are in accordance with the results recorded by Pande (2003) Manojkumar and Singh (2005) and Tangade (2007) who reported significant improvement of body weight in broilers at 6th week when supplemented with natural Vitamin C (amla) as compared to synthetic Vitamin C. Daisy *et al.* (2007) had reported significant improvement in body weight in broilers when supplemented amla fruit powder in water. Singh *et al.* (2008) also showed that amla improved body weight at 6th weeks of age. Ghavate (2009) reported significant effect of supplementation of amla at the rate of 10 kg/ton and 15 kg/ton of feed on body weight of broilers at 6th week of age.

Weight Gain

The initial body weight gain of broilers for all treatment groups were almost similar showing statistically non-significant difference up to third week of age. The average weekly body weight gain at sixth weeks of age was 467.53, 466.37 and 502.15 g in T_1 , T_2 , and T_3 treatments groups, respectively. The above findings indicate that there was improvement in body weight gain in treated groups as compared to control group. However, T_2 (AM @ 0.5%) could not elicit significant difference in live weight gain. During fifth week of age maximum weight gain was recorded in all the treatment groups and thereafter gains in weight was decreasing in nature.

Similarly the improvement in the body weight gain in broilers fed amla powder have also reported

in the literature (Pande, 2003; Manojkumar and Singh, 2005; Daisy *et al.*, 2007, and Maini *et al.*, 2007) Tangade (2007) also reported significant improvement in weekly gain in body weight in natural Vitamin C (amla) fed birds as compared to synthetic Vitamin C. Wadhwa *et al.* (2007) showed increased gain in body weight during 0-4 weeks. Singh *et al.* (2009) have observed better body weight gain, supplementing Superliv containing *Phyllanthus emblica* in broilers.

Cumulative Weekly Feed Consumption

The cumulative feed consumption at sixth weeks of age was 3965.30, 3891.22 and 3832.35 g respectively in T₁, T₂, and T₃ treatments groups. The cumulative feed consumption of broilers for the treatment groups was lesser as compared to control. The cumulative weekly feed consumption for broiler was found to be significant within treatment groups.

The feed intake of all the chicks receiving AM was lower than of control and there was a linear decrease with the level of addition, (Kumari *et al.*, 2012). Similarly, decrease in feed consumption as above was also reported by (Gujral *et al.*, 2002; Wadhwa *et al.*, 2007, and Bisht *et al.*, 2005) who supplemented amla powder in broiler ration. However Tangade (2007) reported significant improvement in feed consumption in natural Vitamin C (amla) as compared to synthetic Vitamin C. and Singh *et al.* (2009) by supplementation of Superliv DS containing *Emblca officinalis*. Ghavate *et al.* (2009) observed significant increase in feed consumption with the supplementation of *Emblca officinalis*.

Cumulative Weekly Feed Efficiency

The cumulative feed efficiency of various groups T₁ to T₃ was 1.85, 1.76 and 1.71, respectively. The feed conversion ratio for supplement group was significant improved than the control group. The similar trend as in weekly feed efficiency was also evident for cumulative FCR. The improvement in feed efficiency was attributed the combined effect of significant less feed consumption and more gain in weight AM (T₂, T₃) groups and less feed consumption in AM (1%). The better feed efficiency was observed in AM (1%) as compared to control group. The better FCR was recorded in treatment T₃ (1.71).

The feed conservation efficiency improved as level of AM increased similar observation have noted by Rekhate *et al.* (2010). The feed intake of all the chicks receiving AM was lower than of control and there was a linear decrease with level of addition (Kumari *et al.*, 2012). The results showed that the cumulative feed conversion efficiency at the end of experiment was better in group T₃ followed by T₂ and T₁. The improvement cumulative feed conversion efficiency obtained in this study is in agreement with the reports of Kumari *et al.* (2012).

Dressing Percentage

Dressing percentage for all the treatment groups was calculated by slaughtering three birds from each treatment groups. The average dressing percentage among the different treatment groups varied between 66.65 to 67.76 per cent. The differences among all the treatment groups were found to be non-significant. Numerically higher dressing percentage was recorded in treatment T₃ (67.76).

Economics of Broilers Production

The economics of broiler production was estimated by, considering the total amount of feed consumed by broilers under T₁, T₂ and T₃ treatments groups and other inputs such as cost of day old chicks, Amla Powder (AM) as feed additive, medicine, vaccines and litter material. However, the costs of labors, electricity, etc. we're not considered in calculating the economics of broiler production being post graduate research work. The data on economics is presented in Table 2.

Table 1
Broiler traits in different groups of chicks up to 6th weeks of age

Treatments	6 th week weight (g/bird)	Body weight gain (g/bird)	Feed intake (g/bird)	Feed efficiency	Dressing percentage
T1: Control	2178.01	467.53	3965.30	1.85	65.61
T2: 0.5 % AM	2246.74	466.37	3891.22	1.76	66.65
T3: 1% AM	2304.53	502.15	3832.35	1.71	67.76
'F' test	Sig	Sig	Sig	Sig	NS
SE (m)±	30.09	6.71	6.68	9.80	2.03
CD	89.38	18.62	9.45	0.02	3.70

Table 2
Economic efficiency of Broiler traits in different groups at 6th weeks of age

Sr. No.	Particulars	T1	T2	T3
1.	Cost of day old chick (Rs.)	23	23	23
2.	Cost of feed (Rs/kg)	30.40	30.40	30.40
3.	Cost of AM (Rs)	0	0.40	0.80
4.	Total cost of feed (Rs/kg)	30.40	31.60	32
5.	Average total feed consumed per bird (Kg)	3.965	3.891	3.832
6.	Cost of feed consumed per bird (Rs.)	120.53	119.84	119.24
7.	Average body weight at the end of 6 th week (Kg)	2.178	2.246	2.304
8.	Feed consumption per kg live weight gain (Kg)	1.820	1.723	1.658
9.	Cost of feed per kg live weight gain (Rs.)	55.34	53.35	51.75
10.	Rearing Cost per bird (Rs.)	4.94	4.94	4.94
11.	Total cost of production (Rs.) (1 + 6 + 10)	148.47	147.78	147.18
12.	Average price realized @ Rs. 75 per kg live weight (Rs.)	152.46	157.22	161.28
13.	Net profit per bird (Rs.) (12-11)	3.99	9.44	14.10

It may be seen from values in Table 2 that the cost of feed in T₂ and T₃ increased in accordance with the level of addition of AM. Moreover, broilers in treatment groups T₃ gained highest body weight (2304.53 g) with cost of feed consumed per bird (Rs. 119.24) and control group gained weight (2178.08 g) with feed cost (Rs. 120.53).

The net profit per bird was highest in T3 (Rs. 14.10) followed by T2 (9.44) and lower in T₁ (3.99) as indicated in table 2. Broiler in T₂ and T₃ group consumed lower feed per Kg live weight as compared to control T-1 group which gained lower average body weight at the end of six week. This indicated that broilers in group T₃ (AM) showed better feed utilization as compared to the broilers in control group.

The economical benefits due to supplementation of AM have also been reported by Shisodiya et al. (2008) and Karadkar et al. (2009). Pandey et al. (2013) reported higher net profit per bird in broiler supplemented with herbal fed additives in diet.

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