



# To study the effect of feeding of amla powder on growth performance of broiler chicks

Pradeep Nodal\*, Siddhartha Mishra<sup>1</sup>, Tetarwal J.M.<sup>2</sup>, Chopra G.<sup>3</sup>

\*Ph.D. Research Scholar Department of Animal Production Rajasthan College of Agriculture MPUAT Udaipur (Raj.) 313001

<sup>1</sup>Associate professor Department of Animal Production Rajasthan College of Agriculture MPUAT Udaipur (Raj.) 313001

<sup>2</sup>SMS (Subject Matter Specialist) Livestock production and Management CAZRI-KVK Pali (Raj.) 306401

<sup>3</sup>STO (Senior Technical Officer) Livestock production and Management CSWRI Malpura Tonk (Raj.) 304501

Corresponding author: Pradeep Nodal\*, E-mail: [pardeenodal418@gmail.com](mailto:pardeenodal418@gmail.com)

Received: 16 Jun 2024; Received in revised form: 17 Jul 2024; Accepted: 25 Jul 2024; Available online: 01 Aug 2024

©2024 The Author(s). Published by Infogain Publication. This is an open access article under the CC BY license

(<https://creativecommons.org/licenses/by/4.0/>).

**Abstract**— As per 20<sup>th</sup> livestock census, the total poultry population in India has increased by 16.81% and the total poultry production recorded was 851.81 million during 2019. Out of total poultry population 37.8 % is under backyard production system in Rajasthan. However, the southern Rajasthan has about 16.3 % of total poultry of Rajasthan and it also has 41.2 % of total poultry of Rajasthan under backyard system. The total poultry population in Rajasthan has registered a phenomenal increase of about 80% over last livestock census and the current poultry population is 14.62 million, however, it is only 1.72% of poultry population of India (BAHS, 2019). The present study was conducted to assess the effect of feeding amla (*Emblica officinalis*) powder on performance and carcass characteristics of broiler chicks. One hundred sixty broiler chicks (day old chicks) were randomly allotted to 4 dietary treatments with 4 replicates of 10 chicks each. The treatment included the (T<sub>1</sub>) control, (T<sub>2</sub>) control group supplemented with amla powder @ 0.5%, (T<sub>3</sub>) control group supplemented with Amla powder @ 1.0%, (T<sub>4</sub>) control group supplemented with Amla powder @ 1.5%. The effect of supplementation was observed on the body weight, body weight gain, feed intake, FCR, nutrient utilization, nutrient balance, carcass traits viz., live weight, slaughter weight, eviscerated weight, dressing weight, weight of heart, liver, gizzard, and economics in broiler chicks.



**Keywords**— performance, chicks, treatment, poultry

## I. INTRODUCTION

Over the last few decades, the health protection of birds and food safety were the priorities for poultry producers. Under the consumer pressure, the utilization of artificial feed additives is banned, and extreme solutions related to intensive rearing are mitigated to ensure the environment safety (Jachimowicz *et al.*, 2022). A complete ban or time bound decline in use of antibiotic growth promoters (AGP) has drawn the concerns of researchers for other natural substances like medicinal herbs, as a new class of additives to animal and poultry feeds growth promoters including herbal preparations for their use with myriad additional benefits (Ranade and Desai, 2005). The utilization of antibiotics in poultry and livestock production is advantageous to farmers and the economy due to improved poultry performance but at the same time,

the likely dissemination of antibiotic resistant strains of pathogenic and non-pathogenic organisms into the environment and their further transmission to humans via the food chain could also lead to serious consequences on public health (Agyare *et al.*, 2019).

Amla or Indian Gooseberry (*Emblica officinalis*), with its origin in India has extensive adaptability to grow in diverse climatic and soil conditions (Pokharkar 2005). The fruits of the plants has early history of use in Ayurveda as a potant rasayana (revitalisers, biological response modifiers) in which the amla was added as anti-stress agent. Amla is one of the richest sources of ascorbic acid, minerals, amino acids, tannins, and phenolic compounds. Amla, richest source of vitamin-C and it's active tannoid principles have antimicrobial, antidiabetics, anticarcinogenic properties and enhances immune property

(Anjaria et al., 2002). It is a great nutritional supplement with several medicinal benefits. Due to the abundance of phenolic compounds, Emblic fruit could be regarded as a plant source for natural antioxidants and nutraceuticals or medicinal components. In various animal and human investigations, amla has been proven to have anti-hyperglycemic, hypoglycemic, anti-inflammatory, anti-hyperlipidemic, and antioxidant activity that helps the body's immune systems and digestion (Gul et al., 2022).

There are plenty resources of different kinds of medicinal herbs which can be explored as natural feed additives for poultry. Commonly known herbs are Aloe vera, Fenugreek, Ashwagandha, *Moringa oleifera*, Cinnamon, Tulsi, Garlic, Pepper etc. Herbal preparations help in the digestion process, safe, cost effective and environment friendly with no side effect (Vinus et al., 2022). Herbal extracts are the powerful stimulators of the immune and animal digestive systems as well as highly beneficial effects in poultry nutrition due to their antioxidant, antimicrobial, antiviral, anticoccidial and anthelmintic properties (Akyildiz and Denli, 2016).

## II. MATERIAL AND METHODS

The research work was undertaken to study the effect of feeding amla (*Emblica officinalis*) powder on growth performance and carcass characteristics of broiler chicks. The experiment was conducted for a period of 60 days including metabolism trial.

### LOCATION

The experiment was conducted at Poultry farm, Department of Animal Production, Rajasthan College of Agriculture, MPUAT Udaipur, located in humid region at 24.35 North and Longitude of 74.42 East with height from the mean sea level 582.2 Meter.

### 1.1 Distribution of experimental Coloured broiler chicks under various treatments

Replications	Treatments			
	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
R <sub>1</sub>	10	10	10	10
R <sub>2</sub>	10	10	10	10
R <sub>3</sub>	10	10	10	10
R <sub>4</sub>	10	10	10	10

### 1.2 Details of experimental treatments

Groups	Treatments	No. of Chicks	Dose
T <sub>1</sub>	Control/Conventional	40	Basal diet

			(Control)
T <sub>2</sub>	Amla ( <i>Emblica officinalis</i> )	40	Basal diet supplemented with 0.5% Amla powder
T <sub>3</sub>	Amla ( <i>Emblica officinalis</i> )	40	Basal diet supplemented with 1% Amla powder
T <sub>4</sub>	Amla ( <i>Emblica officinalis</i> )	40	Basal diet supplemented with 1.5% Amla powder

## HOUSING AND MANAGEMENT

The chicks were reared under strict hygienic condition in the brooder house of the college poultry farm. Before housing the chicks, experimental brooder rooms, equipment's and utensils were cleaned and disinfected thoroughly with phenol and fumigated with formaldehyde gas. The chicks (day old) were weighed at the beginning of the experiment and divided into groups randomly. Rice husk was used as bedding material. The thickness of bedding material was kept 2 inches initially which was subsequently increased by 0.5 inch. The chicks were vaccinated against Ranikhet and Marek's disease.

## FEEDING AND WATERING

Initially the chicks were fed by putting the feed in the trays up to the age of two weeks. After two weeks the chick feeders were used and continued during whole experimental period.

The birds were offered clean and fresh drinking water ad libitum using chick waterers during the whole experimental periods.

## LIGHTING

Proper amount of lighting condition was followed during brooding and in entire period of research work.

## VENTILATION

The brooder house was properly ventilated. Adequate ventilation reduced dust, high moisture and excess ammonia from as improper ventilation affects growth and live ability of broiler chicks.

## III. RESULT AND DISCUSSION

The results with respect to performance of broiler chicks fed amla powder will be discussed in this chapter under following subheads:

1. Body weight
2. Body weight gain
3. Feed intake
4. Feed conversion ratio
5. Nutrient utilization
6. Carcass traits
7. economics

The mean body weights in broiler chicks increased with the advancement age for dayold to 8<sup>th</sup> week of age. The body weight was significantly higher in the group supplemented with amla powder @ 1.0% all ages. The mean body weights at 8<sup>th</sup> week of age were significantly highest ( $P<0.01$ ) in T3 followed by T2, T4 and lowest in T1 group (Table 4.1). Similarly, the overall mean body weight gains were also significantly highest in T3 followed by T2, T4 and lowest in T1. The weekly body weights observed in the present study are lower as compared to the body weights observed by Begum *et al.* (2019), Gaikwad *et al.* (2016) on supplementation of Amla powder and Sandeep *et al.* (2018) on supplementation of Amla and synthetic vitamin c. The mean weekly body weights were recorded up to 7<sup>th</sup> weeks of age i.e., for chick stage of growth. The lower body weights in broiler observed in the present study may be attributed to genetic constitution. The coloured broiler used in present study has shown slower growth as compared to commercial broilers.

The body weight at 6 weeks of age was significantly lower in present study as compared to the observation recorded by Kumari *et al.* (2012) and Gaikwad *et al.* (2016) who reported higher body weights. Gaikwad *et al.* (2016) reviewed the effect of supplementation of Amla powder on growth performance of broiler chicks when supplemented with different levels of Amla powder i.e., 0.5, 1.0 percent along with the basal ration on the growth performance of broiler chicks up to 6 weeks of age. There is limited studies on the effect of amla powder on the performance of broiler up to 8 weeks of age. In the present study the experiment was continued until 8 the weeks.

It evidenced that the Amla powder was found to be beneficial when supplemented at 0.5 to 1.5% of total ration with varying proportions. However, in the present study the supplementation at 1.0% rate was found to be most effective in terms of weekly body weight or body weight gains. The body weight showed declining trend beyond 1.0% level of supplementation, however the supplementation of amla was found to be beneficial when compared to the control where there was no supplementation.

The mean body weight gains at different weeks of age on supplementation of Amla powder in the present study corroborates the findings of other research workers on

supplementation of Amla alone or in combinations of other herbal feed additives / minerals / vitamins. Though the body weight gains at different weeks in present study were found to be lower than other studies which may be attributable to the fact that the present study was conducted on coloured synthetic female line against commercial lines in other studies and the birds are maintained as parent breeding stock in the AICRP on poultry breeding project.

The mean body weight gains at different weeks and overall body weight gain were significantly higher in T3 as compared to T2, T4 and lowest in T1 suggesting dietary supplementation of Amla powder at 1.0% resulted in increase in body weight gains in broiler chicks. Patel *et al.* (2016) have also reported that the mean body weight gains up to 6 weeks of age was highest at supplementation level of 0.4% followed by 0.8% Amla powder. However, in the present study the higher mean body weight gains up to 8 weeks of age was found at 1.0% level of supplementation and it declined thereafter. Aljumaili *et al.* (2019) also reported higher body weight gains at 6 weeks of age on supplementation of Amla (1gm/kg) in combination with Vitamin c @ (250mg/km) each and support our findings.

Gaikwad *et al.* (2016) have reported higher 6<sup>th</sup> week body weight at 2304.53 g and mean body gain at 6<sup>th</sup> week of 502.15g on diet supplemented with 1.0% Amla powder on basal diet, however the body weight reported by Gaikwad and coworkers is lower than the mean body weights observed in the present study.

### Weekly Body Weight

The data with respect to weekly body weights of broiler chicks up to 8<sup>th</sup> weeks of age is presented in Table 4.1.

The initial body weight i.e., the day old weights of chicks were  $42.43\pm 0.58$ ,  $42.30\pm 0.70$ ,  $41.55\pm 0.58$  and  $41.28\pm 0.55$  g T1, T2, T3 and T4 respectively. The data revealed that the body weight at day old was did not differ significantly at 1<sup>st</sup> to 8<sup>th</sup> weeks of age except at day old, on which it was found non-significant.

The body weights at one week of age were  $84.96\pm 1.67$ ,  $90.02\pm 1.74$ ,  $91.96\pm 1.24$  and  $84.03\pm 0.95$  g in T1, T2, T3 and T4 groups respectively. The body weight at 1 week of age was significantly highest ( $P<0.05$ ) in T2 and T3 as compared to T1 and T4. However, the difference between T2 and T3 and T1 and T4 was found statistically non-significant.

The mean body weights at 2 weeks of age were  $175.65\pm 6.67$ ,  $204.03\pm 0.99$ ,  $224.94\pm 1.82$ , and  $190.08\pm 1.13$  g in T1, T2, T3 and T4 respectively. The perusal of data revealed that the body weight was significantly highest in T3 followed by T2, T4 and lowest in T1.

The mean body weights at 3<sup>rd</sup> week of age were 289.93±2.39, 350.06±2.49, 379.90±3.55 and 315.00±1.35 g respectively in T1, T2, T3 and T4 treatment groups. It was found that the body weight was significantly higher (P<0.01) in T3 followed by T2, T4 and lowest in T1.

The mean body weights at 4<sup>th</sup> weeks of age were 495.09±1.50, 579.93±2.30, 625.08±2.29 and 514.94±1.14 g in T1, T2, T3 and T4 respectively. The perusal of data revealed that the mean body weight was significantly highest (P<0.01) in T3 followed by T2, T4 and lowest in T1.

The mean body weights at 5<sup>th</sup> weeks of age were 740.05±2.39, 849.96±2.53, 910.05±2.96, 789.93±3.76 g respectively in T1, T2, T3 and T4 dietary treatment groups. The data revealed that the mean body weights at 5<sup>th</sup> weeks of age was significantly highest (P<0.01) T3, followed by T2, T4 and T1 suggesting that the supplementation of diets with amla powder has increased body weight as compared to control group.

The mean body weights at 6<sup>th</sup> week of age were 994.93±2.29, 1155.05±1.47, 1220.11±2.30 and 1089.87±1.81 g in T1, T2, T3 and T4 groups respectively. The mean body weight at 6<sup>th</sup> weeks of age followed the similar trend being significantly highest (P<0.01) in T3 followed by T2, T4 and lowest in T1 group.

The mean body weight at 7<sup>th</sup> weeks of age was 1295.11±3.14, 1490.07±3.84, 1559.88±5.27 and 1410.08±2.46 g respectively in T1, T2, T3 and T4 respectively. It was found that the mean body weights were significantly highest (P<0.01) in T3 followed by T2, T4 and lowest in T1.

The mean body weights at 8<sup>th</sup> week of age were 1680.11±4.58, 1849.83±3.81, 1995.11±3.23 and 1779.88±2.82 g respectively in T1, T2, T3 and T4. The perusal of data revealed that the mean body weights at 8<sup>th</sup> week of age was significantly highest (P<0.01) in T3 followed by T2, T4 and lowest in T1 group

#### IV. SUMMARY AND CONCLUSION

- To study the effect of feeding of amla powder on growth performance of broiler chicks
- Tassess the effect of feeding amla powder on feed intake and nutrient utilization in broiler chicks
- To study the effect of feeding amla powder on carcass characteristics of broiler chicks.
- To find out the economics of dietary supplementation of amla powder in broiler chicks.
- In the present study amla powder was supplemented with 0.5, 1.0 and 1.5 % of the diet and effect of supplementation was studied on the growth nutrient utilization and carcass traits of the broiler chicks. The results of the research work are summarized as under

#### ACKNOWLEDGEMENT

Authors have deep regards towards Dean, RCA Udaipur and Head of Department, department of animal production for providing all the necessary facilities for conducting this experiment.

#### REFERENCES

- [1] Agyare, C., Boamah, E.V., Zumbi, N.C. and Osei, F.B. 2019. Antibiotic Use in Poultry Production and its Effects on Bacterial Resistance. IntechOpen.
- [2] Anjaria, J., Parabiam, M. and Dwivedi, S. 2002. Ethnovet Heritage. Ahmedabad (1<sup>st</sup> Ed.), Prathik Enterprises, 45.
- [3] Begum, K., Talukdar, J. K., Kalita, K.P., Roy, T.C. and Rahman, R.N.M. 2019. Effect of Dietary Supplementation of Gooseberry/Amla (*Emblca officinalis*) Powder on the Performance of Commercial Broiler Chicken. *International Journal of Livestock Research*, 9(11): 95-102.
- [4] Gul, M., Liu, Z.W., Iahtisham-Ul-Haq, Rabail, R., Faheem, F., Walayat, N., Nawaz, A., Shabbir, M.A., MuneKata, P.E.S., Lorenzo, J.M. and Aadil, R.M. 2022. Functional and nutraceutical significance of amla (*Phyllanthus emblica* L.): A review. *Antioxidants*, 11(5): 816-821.
- [5] Gaikwad, D. S., Nage, S. P. and Chavan, S. D. 2016. Effect of supplementation of Amla (*Emblca officinalis*) on growth performance of broilers. *International Journal of Tropical Agriculture*, 34(3): 1-5.
- [6] Jachimowicz, K., Winiarska-Mieczan, A. and Tomaszewska, E. 2022. The impact of herbal additives for poultry feed on the fatty acid profile of meat. *Animals*, 12(9): 1054.
- [7] Kumari, M., Wadhwa, D., Sharma, V. K. and Sharma, A. 2012. Effect of amla (*Emblca officinalis*) pomace feeding on growth performance of commercial broilers. *Indian Journal Animal Nutrition*, 29(4): 388-392.
- [8] Ranade, A.S. and Desai, D.N. 2005. Natural products for enhanced poultry productivity. IPSACON-2005. poulvet.com.
- [9] Pokharkar, S.M. 2005. Development and performance evaluation of aonla shredding machine. *Beverage Food World*, 32(3): 52-53.
- [10] Sandeep, B., Panda, N., Sethy, K. and Nath, S. 2022. Effect of dietary supplementation of amla (*Emblca officinalis*) powder and equivalent synthetic vitamin C on growth performance in black rock broiler chicken. *The Pharma Innovation Journal*, 11(11): 2002-2007.