RESEARCH ARTICLE

Effect of Dietary Supplementation of Aloe Vera and Amla Fruit Powder on Carcass Traits and Intestinal Microflora in Broiler Chickens

Naushali Gujar*, Rajni Arora

Abstract

Effect of dietary supplementation with Aloe vera (*Aloe barbadensis*) and Amla fruit (*Emblica officinalis*) powder supplementation on carcass traits and intestinal microflora composition was evaluated in broiler chickens. The feeding trial was conducted under standard feeding and managemental conditions with broiler starter (1-21 days) and finisher (22-35 days) ration on 240, day-old Vencobb broiler chicks which were randomly divided into 4 treatment groups (T_1 to T_4) with four replicates of 15 chicks each. Birds were offered basal feed as per the BIS. The treatment groups consisted of control group (T_1) fed only with non-supplemented basal diet, group, T_2 was supplemented with 1% Aloe vera (*Aloe barbadensis*) powder, group T_3 with 1% Amla fruit (*Emblica officinalis*) powder and group T_4 with 0.5% Aloe vera (*Aloe barbadensis*) powder + 0.5% Amla fruit (*Emblica officinalis*) powder in basal feed. The supplementation of Aloe vera (*Aloe barbadensis*) and Amla fruit (*Emblica officinalis*) powder alone and in combination showed highly significant ($p<0.01$) decrease in the gut microflora, *i.e., E. coli* count, but it had non-significant effect on dressed weight, eviscerated weight, weight of heart, liver, gizzard, giblet, intestine length of broiler birds.

Key words: Amla fruit powder, Aloe vera, Broiler, Carcass, Gut microflora.

Ind J Vet Sci and Biotech (2026): 10.48165/ijvsbt.22.1.07

Introduction

Recent ban on the use of antibiotic growth promoters (AGP) in poultry feeds has drawn the concerns of researchers towards the presence of various natural substances like medicinal herbs, as a new class of additives to animal and poultry feeds, with beneficial properties such as anti-oxidant, anti-microbial and anti-fungal (Hardy, 2002) as well as immune-modulatory and anticoccidial effects. So, the use of naturally occurring compounds like herbs, herbal preparations and other botanicals are preferred over chemical compounds to satisfy consumer concerns over safety and toxicity (Makkar *et al*., 2007). Their inclusion in the diet should be encouraged to enhance the bird's performance, improve feed utilization, maintain health and alleviate adverse effect of environmental stress (Vinus *et al*., 2018). There are plenty resources of different kinds of medicinal herbs which can be used as natural feed additives for poultry. Commonly known herbs that have received particular attention from researchers are Aloe vera, Amla, Fenugreek, Ashwagandha, *Moringa oleifera*, Cinnamon, Tulsi, Garlic, Pepper etc.

Amla (*Emblica officinalis*) belongs to family 'Euphorbiaceae' is one of the richest sources of ascorbic acid, minerals, amino acids, tannins and phenolic compounds, emblicanin A and B, pendugluconin, superoxide dismutase, catalase, peroxidase (Bhattacharya *et al*., 2000; Rajak *et al*., 2004). Aloe vera (*Aloe barbadensis*) known as one of the oldest herbs with therapeutic properties, antibacterial (especially Gram-positive bacteria), antiviral property due to presence of an alkaloid (*Aloe emodin*) and antifungal activity. Herbal preparations help in the digestion process and being a component of nature, these preparations are considered safe, cost effective and environment friendly with no side effect. Keeping in view the afore said facts, the present investigation was planned to assess the impact of supplementing aloe vera and amla fruit powder as feed additives on carcass traits and intestinal microflora composition in broiler chickens.

Department of Livestock Production Management, College of Veterinary and Animal Science, Rajasthan University of Veterinary & Animal Science, Bikaner-334001, Rajasthan, India

Corresponding Author: Dr. Naushali Gujar, Department of Livestock Production Management, College of Veterinary and Animal Science, Rajasthan University of Veterinary & Animal Sciences, Bikaner-334001, Rajasthan, India, e-mail: naushaligujar8@gmail.com drrajni75@gmail.com

How to cite this article: Gujar, N., & Arora, R. (2026). Effect of Dietary Supplementation of Aloe Vera and Amla Fruit Powder on Carcass Traits and Intestinal Microflora in Broiler Chickens. Ind J Vet Sci and Biotech, 22(1), 37-41.

Source of support: Nil

Conflict of interest: None

Submitted 05/09/2025 **Accepted** 02/10/2025 **Published** 10/01/2026

Materials and Methods

Experimental Design and Feeding

The study was carried out at Poultry Farm and Department of Livestock Production Management, College of Veterinary and Animal Science (RAJUVAS), Bikaner, Rajasthan (India). A 35 days feeding trial was carried out from September 11, 2022 to October 16, 2022 adopting completely randomized design on 240, day-old, unsexed, apparently healthy, VenCobb broiler chicks procured from a commercial supplier. All the chicks were individually weighed and randomly distributed in four treatment groups with four replicates having 15 chicks in each replicate. The details of the feeding treatments were: T_1 Basal feed (Control), T_2 Basal feed + 1% Aloe vera powder (*Aloe barbadensis*), T_3 Basal feed + 1% Amla powder (*Emblica officinalis*) and T_4 Basal feed + 0.5% Aloe vera powder (*Aloe barbadensis*) + 0.5% Amla powder (*Emblica officinalis*). The basal feed in the form of broiler starter and broiler finisher was procured as per the BIS (2007) from poultry farm, CVAS, Bikaner. *Ad libitum* quantity of starter diet was offered to the birds of all experimental groups from 1-21 days of age and finisher diet from 22-35 days. Identical standard managemental practices regarding brooding, feeding, watering and disease control etc. were followed for each group during entire course of study.

Evaluation of Carcass Parameters

At the end of feeding trial, one bird from each replicate having body weight close to the group average was selected for estimation of carcass characteristics. The selected birds were weighed individually and allowed to fast for 12 h to empty gut contents before sacrifice. The broilers were sacrificed as per standard procedure (Panda, 1995) by severing the occipito-atlantal joint and allowed to bleed completely. Thereafter, the birds were de-feathered and carcasses were eviscerated to measure various parameters of carcass. Carcass yield/ dressed weight was calculated using formula:

$$\text{Dressed weight (\%)} = \frac{\text{Live weight - Wt. of blood, feather, shank and head}}{\text{Live weight}} \times 100$$

The dressed birds were then eviscerated by giving a median cut in the abdomen and removing the crop, gullet, trachea, and viscera. The lungs were scrapped off. Heart, liver, pancreas, spleen, and gizzard were separated from GI tract. The giblets (heart, liver, and gizzard) were cleaned and retained along with the carcass to record eviscerated weight and expressed as percentage of pre-slaughter weight using formula:

$$\text{Eviscerated weight (\%)} = \frac{\text{Dressed weight - weight of viscera except giblet}}{\text{Live weight}} \times 100$$

The weight of giblets (gizzard, heart, and liver) was recorded in gram individually after removal of all the attachments with the help of electronic balance.

Gut Microflora

On 35th day of age intestinal content were collected aseptically from sacrificed birds. The digesta contents were emptied in sterile bag and kept in ice until the time of laboratory analysis. One gram of each sample was diluted in sterile normal saline solution (1:9 sequential dilutions vol/vol) and 0.1 mL diluent of each sample was inoculated on EMB agar plate in duplicate. The plates were then incubated at 37 °C for 24 h. The average number of colonies of *E. coli* was multiplied by reciprocal of the dilution factor and expressed as $\log_{10}$ colony forming units per gram of intestinal content (cfu/g).

Statistical Analysis

The experimental data were subjected to statistical analysis (SPSS *Ver.* 24.0) using one way analysis of variance as described by Snedecor and Cochran (2004) to test significant variation between treatment groups. Probabilities values of less than 0.05 ($p<0.05$) were considered significant. Comparison of mean values was carried out by Duncan's Multiple Range Test. The results were expressed as means ± SEM and interpreted.

Results and Discussion

Dressed and Eviscerated Weight

The mean values of dressed weight and eviscerated weight (%) of broiler chickens in different treatment groups are presented in Table 1. The statistical analysis of data revealed non-significant difference ($p>0.05$) on dressed weight and eviscerated weight among the treatment groups due to effect of supplementation of Aloe vera (*Aloe barbadensis*) and Amla fruit (*Emblica officinalis*) powder. Maximum dressed weight was observed in T_3 group followed by T_2, T_4 and T_1 groups. However, the maximum eviscerated weight was observed in T_2 and the minimum in T_4. The results on Aloe vera well corroborated with the findings of Tanwar *et al.* (2021), who indicated non-significant ($p>0.05$) effect in the value of carcass dressing percentages following feeding diet supplemented with 0.25% and 0.5% Aloe vera powder. Similar results were observed by Yadav *et al.* (2017) with 0.5% and 2% Aloe vera powder supplementation, Singh *et al.* (2014) with 1%, 1.5% and 2% Aloe vera powder supplementation, and Mehala *et al.* (2009) with inclusion of 0.1 and 0.2% Aloe vera powder in broiler diet. Contrary to this, Darabighane *et al.* (2017) observed that dressing per cent was significantly ($p<0.05$) higher in chickens from the group supplemented with 0.5% and 1% Aloe vera powder compared to the control group.

Regarding supplementation of Amla fruit powder, the results were in accordance with Gaur (2022), who

observed no significant (p>0.05) differences in carcass dressing percent when using diet supplemented with 0.75% amla fruit powder. Similar results were observed by Sandeep (2020) with 0.50%, 1.0% and 2.0% of amla fruit powder supplementation, Dalal *et al*. (2018) with 0.25, 0.50, 0.75% and 1.0% amla fruit powder supplementation. Similarly, Kumari *et al.* (2012) and Chaudhary *et al*. (2015) revealed in their studies no significant variation in carcass characteristics in amla either alone or in blend with poly-herbal additives. Contrary to this, Kumar *et al*. (2013) observed significantly (p≤0.01) higher dressing per cent in broiler chickens from the group supplemented with Amla containing herbal product and Vitamin C compared to the control group. Eevuri and Putturu (2013) and Singh *et al*. (2017) also reported that dietary amla powder supplementation significantly increased dressing percentage.

Giblet and Organ Weight (g)

The means of heart, liver, gizzard and giblet weight (g) of broiler chickens in different treatment groups are presented in Table 1. The statistical analysis of data showed non-significant effect of supplementation of Aloe vera (*Aloe barbadensis*) and Amla fruit (*Emblica officinalis*) powder on heart, liver, gizzard and giblet weight, however numerically highest giblet weight was recorded in T_3 group followed by T_2, T_4 and T_1 group. The results on Aloe vera were in accordance with the findings of Tanwar *et al.* (2021), who indicated non-significant effect in the value of heart, liver, gizzard and giblet weight when diet was supplemented with 0.25% and 0.5% Aloe vera powder. Tariq *et al.* (2015) observed non-significant difference in giblet weights with 0.25% and 0.5% Aloe vera and clove powder. Similarly, Sinurat *et al*. (2002) also reported non-significant effect of fresh Aloe vera gel (0.25g/kg) and dry Aloe vera gel (0.25 and 1.0 g/kg) supplementation in broiler diet during experimental period. Contrary to this, Yadav *et al*. (2017) reported significant effect (p<0.05) on giblet per cent with 0.5% and 2% Aloe vera powder supplementation.

Regarding supplementation of Amla fruit powder, the results were in accordance with Gaur (2022), Sandeep (2020) and Eevuri and Putturu (2013), who reported non-significant difference among the treatment groups in terms of giblet weight. Similar results were seen by Dalal *et al*. (2018) with 0.25%, 0.50%, 0.75% and 1% Amla fruit powder supplementation. Contrary to this, Mandal *et al*. (2017) showed significant effect on giblet weight (g) when broiler diet supplemented with 0.1%, 0.2% and 0.3% Amla powder was used.

Gut Microflora: *E. coli* Count

Data pertaining to *E. coli* count (log_{10} cfu/g) of ileal content of the experimental broiler chicks under different dietary treatments ranged from 4.69 to 6.86. The average log value for *E. coli* (log cfu/g) at the end of experimental period were found to be 6.86±0.029 in T_1, 5.20±0.033 in T_2, 4.69±0.027 in T_3 and 4.86±0.021 in T_4 groups, respectively. The statistical analysis of data revealed highly significant (p<0.01) effect of supplementation of Aloe vera (*Aloe barbadensis*) and Amla fruit (*Emblica officinalis*) powder on *E. coli* count, the highest log value for *E. coli* count being observed in T_1 group followed by T_2, T_4 and T_3 group. There was a significant reduction in *E. coli* count in T_3 and T_4 group followed by T_2 group in comparison to the control group (T_1). This might be due to anti-bacterial effect of these herbs which results in inhibition of the growth and colonization of entero-pathogenic microbes in the digestive tract, thus improves gut microflora (Harris *et al*, 2001) and promotes the growth performance and health of birds (Adibmoradi *et al*, 2006).

The present results concurred with Darabighane *et al*. (2017), who observed significant (p<0.01) improvement in intestinal microflora by decrement of *E. coli* count and increment of *Lactobacilli* count following Aloe vera gel supplementation at the level of 1.5%, 2% and 2.5%. Jiang *et al.* (2005) also reported reduction in *E. coli* count when broiler diet was supplemented with 0.1% Aloe vera gel. In the same way, He *et al*. (2011) and Dai *et al*. (2007) also reported reduction in *E. coli* count when poultry diets were supplemented with herbs and polysaccharide contained in Aloe vera.

Regarding addition of Amla fruit powder, Dalal *et al*. (2018) reported highly significant (p<0.01) reduction in *E. coli* count when broilers were supplemented with Amla powder. Similarly, Siddiqui *et al*. (2015) reported significantly decreased both *E. coli* and total bacterial counts broilers extrata following feeding different dietary levels of *Nigella sativa* seed powder.

Table 1: Mean values of carcass traits (%) and organs weight (g) in different treatment groups

			Organs weight (g)			
Group	**Dressed weight (%)**	**Eviscerated weight (%)**	**Heart**	**Liver**	**Gizzard**	**Giblet**
T_1	76.44±1.195	68.37±1.228	8.46 ±0.271	24.16 ±0.635	27.69±0.576	60.30±1.406
T_2	78.19±0.537	70.30±0.656	9.40±0.342	24.59±0.493	28.35±0.728	62.34±1.285
T_3	78.34±1.436	70.17±1.713	9.61±0.639	25.28±1.469	28.75±1.335	63.64± 3.115
T_4	76.49±0.989	68.08±1.013	8.55±0.269	24.71±0.631	27.97±0.631	61.24±1.296

T1, - control, T2 - Aloe vera, T3 - Amla, T4 - combination of both Aloe vera and Amla

Conclusion

From the finding of the present study, it can be concluded that supplementation of feed with Aloe vera (*Aloe barbadensis*) and Amla fruit (*Emblica officinalis*) powder alone and in combination significantly reduced the gut microflora. Thus, inclusion of Amla powder @ 1% and Aloe vera powder @ 1% in the ration of broiler chicks may be useful for the safe, economical, and efficient production of broiler and this formulation could be used as an alternative to commercial growth promoters.

Acknowledgement

This study was supported by Rajasthan University of Veterinary & Animal Science, Department of Livestock Production Management, CVAS, Bikaner, Rajasthan.

References

Adibmoradi, M., Navidshad, B., Seifdavati, J., & Royan, M. (2006). Effect of dietary garlic meal on histological structure of small intestine in broiler chicken. *The Journal of Poultry Science, 43,* 373-378.

Bhattacharya, A., Chatterjee, A., Ghosal, S., & Bhattacharya, S.K. (2000) Antioxidant activity of tannoid principles of *Emblica officinalis* (Amla) in chronic stress induced changes in rat brain. *Indian Journal of Experimental Biology, 38*(9), 877-880

BIS (2007). *Nutrient Requirements of Poultry*. Bureau of Indian Standards, New Delhi, India.

Chaudhary, R.K., Singh, V.K., Singh, S.P., Gautam, S., & Tewari, D. (2015). Effect of herbal supplements of *Curcuma longa, Emblica officinalis* and *Nigella sativa* on performance of broilers. *Indian Journal of Animal Nutrition, 32*(1), 90-95.

Dai, B., Jiang, L., & Chen, S. (2007). Effects of medicinal herb and polysaccharide from Aloe on gut microflora, immune function and growth performance in broiler. *China Poultry, 29,* 21-24.

Dalal, R., kumar Ahlawat, P., Vinus, S., & Panwar, V.S. (2018). Effect of amla fruit powder on haemato-biochemical parameters of broiler poultry chicken. *The Pharma Innovation Journal*, *7*(4), 20-24.

Darabighane, B., Mirzaei Aghjeh Gheshlagh, F., Navidshad, B., Mahdavi, A., Zarei, A., & Nahashon, S. (2017). Effects of peppermint (*Mentha piperita*) and Aloe vera (*Aloe barbadensis*) on ileum microflora population and growth performance of broiler chickens in comparison with antibiotic growth promoter. *Iranian Journal of Applied Animal Science, 7*(1), 101-108.

Eevuri, T R., & Putturu, R. (2013). Use of certain herbal preparation in broiler feeds. *Veterinary World, 6*(3), 172-179.

Gaur, K. (2022). Effect of dietary supplementation of amla fruit powder (*Emblica officinalis*) and multienzyme on performance of broiler chickens. *M.V.Sc. Thesis*. Rajasthan University of Veterinary & Animal Sciences, Bikaner, India.

Hardy, B. (2002). The issue of antibiotic use in the livestock industry: What have we learned? *Animal Biotechnology, 13,* 129-147.

Harris, J.C., Cottrell, S., Plummer, S., & Lloyd, D. (2001). Antimicrobial properties of *Allium sativum* (garlic). *Applied Microbiology and Biotechnology, 57*(3), 282-286.

He, C.L., Fu, B.D., Shen, H.Q., Jiang, X.L., & Wei, X.B. (2011). Fumaric acid, an antibacterial component of Aloe vera *L*. *African Journal of Biotechnology, 10*, 2973-2977.

Jiang L., Feng Y., Yang X., Zhou X., & Yang D. (2005). Effects of gel, polysaccharide and acemannan from Aloe vera on broiler gut flora, microvilli density, immune function and growth performance. *Chinese Journal of Veterinary Science, 25,* 668-671.

Kumar, M., Sharma, R.K., Chaudhari, M., & Jakhar, A. (2013). Effect of Indian gooseberry and multienzyme supplementation on the performance of broilers during hot weather. *Haryana Veterinarian, 52,* 66-68.

Kumari, M., Wadhwa, D., Sharma, V.K., & Sharma, A. (2012). Effect of Amla (*Emblica officinalis*) pomace feeding on growth performance of commercial broilers. *Indian Journal of Animal Nutrition, 29*(4), 388-392.

Makkar, H.P.S., Francis, G., & Becker, K. (2007). Bioactivity of phytochemicals in some lesser-known plants and their effects and potential applications in livestock and aquaculture production systems. *Animal, 1*(9), 1371-1391.

Mandal, A.B., Kulkarni, R., Rokade, J.J., Bhanja, S.K., & Singh, R. (2017). Effect of dietary addition of amla (*Emblica officinalis*) on performance and hsp70 gene expression in coloured broiler chicken during extreme summer. *Journal of Animal Research, 7*(2), 233-241

Mehala, C., Moorthy, M., Amutha, R., & Ravi, R. (2009). Carcass characteristics of broilers fed diet with Aloe vera and *Curcuma longa*. *Indian Veterinary Journal, 86*(12), 1257-1258.

Panda, P.C. (1995). Slaughtering techniques. In: *Text Book on Egg and Poultry Technology.* Vikas Publications, New Delhi, India.

Rajak, S., Banerjee, S.K., Sood, S., Dinda, A.K., Gupta, Y.K., Gupta, S.K., & Maulik, S.K. (2004). *Emblica officinalis* causes myocardial adaptation and protect against oxidative stress in ischaemic reperfusion injury in rats. *Phytotherapy Research: Evaluation of Natural Product Derivatives, 18*(1), 54-60.

Sandeep, B.S. (2020). Effect of dietary supplementation of amla *(Emblica officinalis)* on performance and antioxidant status in commercial broiler chicken. *M.V.Sc. Thesis*. Odisha University of Agriculture and Technology, Bhubaneswar, India.

Siddiqui, M.N., Islam, M.T., Sayed, M.A., & Hossain, M.A. (2015). Effect of dietary supplementation of acetone extracts of Nigella sativa L. seeds on serum cholesterol and pathogenic intestinal bacterial count in broilers. *Journal of Animal & Plant Sciences, 25*(2), 372-379.

Singh, J., Sethi, A.P.S., Sikka, S.S., Chatli, M.K., & Mehta, N (2014). Effect of sun dried whole leaf Aloe vera powder on growth, carcass characteristics and meat quality of commercial broilers. *Indian Journal of Poultry Science, 49*(1), 21-24.

Singh, J., Sharma, M., Singh, N., Kaur, P., Sethi, A.P.S., & Sikka, S.S. (2017). Effect of supplementation of Aloe vera on growth performance in broilers chicks. *Chemical Sciebce: Reviews & Letters, 6*(22), 1238-1243.

Sinurat, A.P., Purwadaria, T., Togatorop, M.H., Pasaribu, T., Bintang, I.A.K., Sitompul, S., & Rosida, J. (2002). Responses of broilers to Aloe vera bioactives as feed additive: The effect of different forms and levels of bioactives on performances of broilers. *Journal Ilmu Ternakdan Veteriner, 7*(2), 69-75.

Snedecor, W.G., & Cochran, G.W. (2004). *Statistical Methods*, 8th edn., Iowa State University Press, Ames, Iowa, USA.

Tanwar, R., Sharma, V., Karnani, M., & Choudhary, S. (2021). Effects of supplementation of Aloe vera (*Aloe barbadensis*) and Tulsi (*Ocimum sanctum*) as feed additives on performance of broiler chickens. *Indian Journal of Animal Nutrition, 38*(3), 304-309.

Tariq, H., Rao, P.V.R., Raghuvanshi, Rita S., Mondal, B.C., & Singh, S.K. (2015). Effect of *Aloe vera* and *Clove* powder supplementation on carcass characteristics, composition and serum enzymes of Japanese quails. *Veterinary World, 8*(5), 664-668**.**

Vinus, R.D., Sheoran, N., Maan, N., & Tewatia, B. (2018). Potential benefits of herbal supplements in poultry feed: A review. *The Pharma Innovation Journal, 7*(6), 651-656.

Yadav, D.C., Bidhan, D.S., Yadav, S., Kumar, S., & Sihag, S.S. (2017). Effect of Aloe vera (*Aloe barbadensis*) supplementation on carcass characteristics and proximate composition of broiler chicken meat. *Indian Journal of Animal Nutrition, 34*(3), 338-342.