

International Journal of Agriculture Extension and Social Development

Volume 9; SP-Issue 5; May 2026; Page No. 99-101

Received: 14-02-2026
Accepted: 20-03-2026

Indexed Journal
Peer Reviewed Journal

Influence of natural vitamin E, vitamin C, choline and herbal liver supplements on carcass traits of commercial broiler chickens

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DOI: <https://doi.org/10.33545/26180723.2026.v9.i5Sb.3618>

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Abstract

An experiment was conducted to study the effect of natural vitamin E, vitamin C, choline and herbal liver supplement on carcass traits and visceral organ weights of commercial broilers. A total of 150 day-old commercial broiler (Vencobb) chicks were distributed into five treatment groups with three replicates in each group and ten chicks in each replicate. Basal diet (T₁, control) prepared following BIS standards and the experimental diets were prepared by incorporating natural vitamin E, vitamin C, Choline and herbal liver supplement to the treatment groups T₂, T₃, T₄ and T₅, respectively each at 0.1% to the basal diet. At the end of the experiment, two birds from each replicate from all treatment groups were slaughtered to study the carcass characteristics like dressing per centage, drumstick yield, thigh yield, breast yield, abdominal fat and visceral organ (heart, liver, gizzard and proventriculus) weights were recorded and expressed in terms of gram per cent (g/100 g).

Broilers receiving the herbal liver supplement exhibited a significant increase in dressing percentage and drumstick yield, while birds supplemented with choline showed a significant enhancement in thigh yield. The remaining treatment groups did not produce any significant effect on carcass traits and visceral organ weights.

Keywords: Natural, herbal, commercial broiler, carcass traits, visceral organs

Introduction

With the restriction on certain antibiotics, concerns about their adverse effects, and their rising cost, herbal feed additives are gaining increasing significance in poultry production. Herbs and their active constituents have been widely investigated over the past two decades as alternatives for enhancing growth performance, as they can beneficially influence metabolism by stimulating digestion, boosting immune function, lowering inflammation, and offering antimicrobial and antioxidant actions. Aromatic plant extracts contain key bioactive compounds such as phenolics, polyketides, terpenes, and steroids. Among these, phenolic compounds are considered particularly beneficial secondary metabolites. Several studies have reported that the inclusion of different herbal extracts in poultry diets leads to improved weight gain, better carcass characteristics, and reduced mortality (Giannenas *et al.*, 2018) [4].

Gaikawad *et al.* supplemented Amla powder (*Emblica officinalis*) as natural vitamin C in broiler chickens and observed that no significant effect on carcass characteristics as compared to control birds but numerical increase in dressing per centage was seen in group supplemented with amla powder at 1% in basal diet. Dhumal *et al.* (2018) [2] found non-significant differences among the treatment groups and concluded that edible carcass yield, breast yield, heart, liver and gizzard weight produced by birds fed 0.05% herbal liver supplemented diet are similar to that of control group (no herbal liver supplement) without affecting the carcass yield. Somavanshi *et al.* (2020) observed higher

dressing per centage in broiler chickens treated with herbal liver stimulant than control group. Highest dressing per centage was observed in group G4 (12 ml/25 birds/day) followed by G3 (9 ml) and G2 (6 ml) the difference between three treatment groups found statistically significant.

Materials and Methods

A total of one-hundred-and-fifty-day-old commercial broiler (Cobb) chicks were procured from the Venkateshwara hatcheries Pvt. Ltd. All the chicks were weighed and wing banded individually. The chicks were allocated to five experimental groups each consisting of three replicates with ten chicks each. The chicks were reared in deep litter system and maintained under standard managerial practices till 42 days of age. Birds were vaccinated against Newcastle disease and Infectious bursal disease as per the schedule. Feed and water were provided *ad libitum* throughout the experimental period. The basal diet (control-T₁) was formulated in accordance with the BIS (2007) standards of nutrient requirements. Natural vitamin E, vitamin C, choline and herbal liver supplement were added to the treatment groups T₂, T₃, T₄ and T₅ respectively each at 0.1% to the basal diet. Chicks were vaccinated against ND with B1 strain on seventh day and booster dose with LaSota strain on twenty first day through intra ocular route and IBD with intermediate strain on fourteenth day and on twenty eighth day through intra ocular route. Description of experimental groups is given in Table 1.0.

At the end of the experiment, two birds from each replicate from all treatment groups were slaughtered to study the carcass characteristics like dressing per centage, drumstick yield, thigh yield, breast yield, abdominal fat and visceral organ (heart, liver, gizzard and proventriculus) weights were recorded and expressed in terms of gram per cent (g/100 g). Before being slaughtered, the birds underwent a 12-hour fast and were only given access to ad-libitum drinking water. Birds were slaughtered humanely by severing the jugular vein and carotid artery on one side of the neck, allowed to bleed for 1-2 minutes, and scalding them for two minutes at 54°C in a dunking scalding, defeathered mechanically for 30-60 seconds in a rotary drum picker. The birds were dressed by cutting the head at Atlanta-occipital joint, legs at hock joint and the carcass was eviscerated by making a slit opening at the abdominal area to remove gastrointestinal tract, separable fat, edible and non-edible organs from the carcass. The carcass traits were calculated as follows

$$\text{Dressing per centage} = \frac{\text{Carcass weight (g)}}{\text{Pre slaughter live weight (g)}} \times 100$$

$$\text{Drumstick yield per centage} = \frac{\text{Drumstick weight (g)}}{\text{Pre slaughter live weight (g)}} \times 100$$

$$\text{Drumstick yield per centage} = \frac{\text{Drumstick weight (g)}}{\text{Pre slaughter live weight (g)}} \times 100$$

$$\text{Breast yield per centage} = \frac{\text{Breast weight (g)}}{\text{Pre slaughter live weight (g)}} \times 100$$

$$\text{Abdominal fat per cent} = \frac{\text{Abdominal fat weight (g)}}{\text{Pre slaughter live weight (g)}} \times 100$$

$$\text{Visceral organ weight per cent} = \frac{\text{Weight of organ (g)}}{\text{Pre slaughter live weight (g)}} \times 100$$

Main herbal ingredients of test materials (natural products)

Vitamin E: *Berberis vulgaris*, *Withania somnifera* and *Rheum palmatum*.

Vitamin C: *Ocimum sanctum*, *Phyllanthus emblica* and *Terminalia belerica*.

Choline: *Acacia nilotica*, *Curcuma longa*, *Andrographis paniculata* and *Azadirachta indica*.

Liver supplement: *Eclipta alba*, *Achyranthus aspera*, *Solanum nigrum* and *Tinospora cordifolia*.

Table 1: Description of experimental groups

Experimental Group	Description of the treatment	No. of replicates	No. of birds per replicate	Total
T ₁	Basal diet	3	10	30
T ₂	Basal diet + 0.1% natural vitamin E	3	10	30
T ₃	Basal diet + 0.1% natural vitamin C	3	10	30
T ₄	Basal diet + 0.1% natural choline	3	10	30
T ₅	Basal diet + 0.1% herbal liver supplement	3	10	30
			Total	150

Results and Discussion

Carcass traits

The results of the effect of natural vitamin E, vitamin C, choline and herbal liver supplement on different carcass traits on 42nd day in broilers were presented in Table 2.0. and visceral organs weights in Table 3.0.

At the end of 42nd day of the experiment, the mean dressing per centage in groups T₁, T₂, T₃ and T₄ and T₅ were 64.83, 64.83, 64.16, 69.33 and 73.66 per cent, respectively. The treatment group T₅ recorded the highest dressing per centage and were significantly ($P \leq 0.05$) higher compared to T₁, T₂ and T₃ groups. There is no significant ($P > 0.05$) difference in the dressing per centage among T₁, T₂, T₃ and T₄ and also between T₄ and T₅. The yield of breast (%) in groups T₁, T₂, T₃, T₄ and T₅ at 42nd day were 34.81, 34.22, 33.95, 34.73 and 34.18, respectively. Statistical analysis revealed no significant ($P > 0.05$) difference in yield of breast between the different treatments and control. The yield of thigh yield (%) in groups T₁, T₂, T₃, T₄ and T₅ at 42nd day were 14.75, 14.72, 14.79, 16.01 and 15.05, respectively. Statistical analysis revealed significant ($P \leq 0.05$) difference in yield of thigh between the treatments. The group T₄ recorded the highest thigh yield and were significantly ($P \leq 0.05$) different from T₁, T₂ and T₃. However, no significant ($P > 0.05$) difference was observed in the thigh yield in the groups T₁, T₂, T₃ and T₅ and also

between T₄ and T₅ groups.

The yield of drumstick yield (%) in groups T₁, T₂, T₃, T₄ and T₅ at 42nd day were 17.64, 17.44, 17.55, 17.00 and 15.52, respectively. Statistical analysis revealed significant ($P \leq 0.05$) difference in yield of drumstick between the treatments. The group T₅ shows statistically significant ($P \leq 0.05$) compared to T₁, T₂ and T₃. However, no significant ($P > 0.05$) difference was observed in the drumstick yield among the groups T₁, T₂, T₃ and T₄ and also between T₄ and T₅ groups. The abdominal fat (%) in groups T₁, T₂, T₃, T₄ and T₅ at 42nd day were 1.27, 1.49, 1.26, 1.22 and 0.98, respectively. Statistical analysis revealed no significant ($P > 0.05$) difference in the abdominal fat per centage between the different treatments and control. No significant differences observed in visceral organ weights.

The results of the present study are in agreement with the findings of Shiva Kumar *et al.* (2005) [7], Sharma *et al.* (2008) [6], and Amitav *et al.* (2015) [1], who reported improved carcass traits in broiler chickens supplemented with herbal liver stimulants. The significant increase in carcass features in the group receiving the herbal liver supplement may be attributable to the constituent herbs, which enhance digestion and metabolism and, as a result, improve mucosal function, protein utilization, and lower the cost of metabolic deamination.

Table 2: Effect of natural vitamin E, vitamin C, choline and herbal liver supplement on carcass traits (% of live weight) (Mean $\pm$ SE) at the 42nd day in commercial broilers

Experimental Group	Diet	Dressing%	Breast yield%	Thigh yield%	Drumstick yield%	Abdominal fat%
T ₁	Basal diet	64.83 $\pm$ 1.70 ^b	34.81 $\pm$ 1.96	14.75 $\pm$ 0.25 ^b	17.64 $\pm$ 0.19 ^a	1.27 $\pm$ 0.05
T ₂	Basal diet + 0.1% natural vitamin E	64.83 $\pm$ 2.78 ^b	34.22 $\pm$ 2.47	14.72 $\pm$ 0.33 ^b	17.44 $\pm$ 0.59 ^a	1.49 $\pm$ 0.22
T ₃	Basal diet + 0.1% natural vitamin C	64.16 $\pm$ 1.88 ^b	33.95 $\pm$ 0.91	14.79 $\pm$ 0.32 ^b	17.55 $\pm$ 0.32 ^a	1.26 $\pm$ 0.09
T ₄	Basal diet + 0.1% natural choline	69.33 $\pm$ 0.76 ^{ab}	34.73 $\pm$ 0.86	16.01 $\pm$ 0.31 ^a	17.00 $\pm$ 0.58 ^{ab}	1.22 $\pm$ 0.13
T ₅	Basal diet + 0.1% herbal liver supplement	73.66 $\pm$ 1.14 ^a	34.18 $\pm$ 0.53	15.05 $\pm$ 0.17 ^{ab}	15.52 $\pm$ 0.21 ^b	0.98 $\pm$ 0.04

^{a,b,c} Means in the same column with no common superscript differ significantly ($P \leq 0.05$)

Table 3: Effect of natural vitamin E, vitamin C, choline and herbal liver supplement on per cent relative visceral organs weight (% of live weight) (Mean $\pm$ SE) at the 42nd day in commercial broilers

Experimental Group	Diet	Heart	Liver	Proventriculus	Gizzard
T ₁	Basal diet	0.673 $\pm$ 0.03	2.53 $\pm$ 0.06	0.698 $\pm$ 0.02	2.91 $\pm$ 0.06
T ₂	Basal diet + 0.1% natural vitamin E	0.615 $\pm$ 0.06	2.50 $\pm$ 0.18	0.648 $\pm$ 0.04	2.82 $\pm$ 0.19
T ₃	Basal diet + 0.1% natural vitamin C	0.570 $\pm$ 0.05	2.40 $\pm$ 0.07	0.672 $\pm$ 0.02	2.71 $\pm$ 0.07
T ₄	Basal diet + 0.1% natural choline	0.602 $\pm$ 0.04	2.36 $\pm$ 0.072	0.592 $\pm$ 0.04	2.75 $\pm$ 0.08
T ₅	Basal diet + 0.1% herbal liver supplement	0.590 $\pm$ 0.04	2.22 $\pm$ 0.074	0.557 $\pm$ 0.04	2.59 $\pm$ 0.05

Conclusion

Natural vitamin E, vitamin C and choline supplementation have no significant effect on carcass characteristics and visceral organs weight. Broilers receiving the herbal liver supplement exhibited a significant increase in dressing percentage and drumstick yield, while birds supplemented with choline showed a significant enhancement in thigh yield. The remaining treatment groups did not produce any significant effect on carcass traits and visceral organ weights.

Performance promoting ability of herbal liver stimulant in broiler. In: Proceedings of the XXIII Annual Conference and National Symposium of Indian Poultry Science Association; 2005 Feb 2-4; Hyderabad. p. 136.

References

1. Amitav B, Adarsh C, Shivi M, Ravikanth K. Effect of supplementation of Superliv liquid on the performance of commercial broilers in Salimpur poultry farm of Mathura. International Journal of Advanced Research. 2015;3:539-543.
2. Dhumal MV, Nikam MG, Nandedkar PV, Majee SB, Kotagiri R. Efficacy of herbal liver tonic (Superliv) in improving growth performance, nutrient utilization, carcass traits and economics of broiler chicken. International Journal of Livestock Research. 2018;8(6):2277-1964.
3. Gaikwad DS, Nage SP, Chavan SD. Effect of supplementation of amla (*Emblca officinalis*) on growth performance of broilers. Journal of Agricultural Research and Technology. 2019;44(3):233-237.
4. Giannenas I, Bonos E, Skoufos I, Tzora A, Stylianaki I, Lazari D, et al. Effect of herbal feed additives on performance parameters, intestinal microbiota, intestinal morphology and meat lipid oxidation of broiler chickens. British Poultry Science. 2018;59(5):545-553.
5. Mohamed NA, Nabil A, Agabou A. Application of herbs and phytogetic feed additives in poultry production. Global Journal of Animal Scientific Research. 2014;2(3):234-243.
6. Sharma RK, Maini S, Ravikanth K. Beneficial effects of Superliv DS and Xlivpro on growth promotion and carcass quality traits in broilers. Veterinary World. 2008;1(12):363-365.
7. Shiva Kumar MC, Pugha Sheti BK, Mull JA.