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Effect of natural vitamin E, vitamin C, choline and herbal liver supplement on immune response in commercial broilers

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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 growth performance, carcass characteristics, immune status and serum biochemical parameters of commercial broilers. A total of 150, day-old commercial broiler (Cobb) chicks were distributed into five treatment groups with three replicates in each group and ten chicks in each replicate. Basal diet (T1) 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. Results revealed non significant difference ($p \leq 0.05$) on Immune response against Newcastle disease and Infectious bursal disease and also lymphoid organs weight between different treatment groups and control group.

Keywords: Natural, commercial broiler, herbal, vitamin, supplement, immune response

1. Introduction

Due to the ban on the use of some antibiotics, dangerous aftereffects, and cost effectiveness, the use of herbal feed additives is becoming more and more important in the production of chickens (Nadir *et al.*, 2014) [9]. Because they may positively affect animal metabolism through their capacity to stimulate digestion, enhance immune response, reduce inflammatory potential, and provide antimicrobial and antioxidant properties, herbs and their purified constituents have been extensively studied in the last couple of decades as alternative growth performance enhancers.

Vitamin E is a fat-soluble vitamin and is recognised to be a powerful antioxidant. (Sahin *et al.*, 2002) [11]. The naturally occurring molecule is the D- α -tocopherol (RRR-tocopherol) configuration, which has the maximum vitamin activity. Studies have revealed that D- α -tocopherol has a higher bioavailability than the synthetic DL- α -tocopherol acetate in tissues, reducing the inflammatory response caused by lipopolysaccharide and enhancing the quality of meat and muscle antioxidant capacity (Cheng *et al.*, 2016) [12]. Typically, it is believed that poultry's endogenous production of vitamin C synthesis is insufficient to meet their biological needs, particularly under adverse environmental conditions (Pardue and Thaxton, 1986) [10]. When vitamin C was added to the diet of stressed birds, there were noticeable improvements in the growth of the chicks. Supplementation of choline in poultry ration is well established to improve growth, performance & carcass quality and more importantly prevention of fatty liver condition in chickens (Kiran Kumari, 2011) [7]. Naturally, phosphatidylcholine, free choline, and sphingomyelin are all forms of choline that can be found in plants. Traditional and synthetic medications used to treat liver problems do not provide appropriate protection and occasionally have harmful side effects (Guntupalli *et al.*, 2006) [5]. Many herbs toning up the liver of poultry birds for maximum performance and productivity through their therapeutic action, such as liver cell rejuvenation (hepatogenerative), hepato-stimulative, hepato-protective, anti-hepatotoxic, and positive anabolic effect, enables them to reach their full growth and performance potential (Dhumal *et al.*, 2018; Somavanshi *et al.*, 2020) [4, 12].

2. 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.

The serum samples collected at 42nd day were assayed for antibody titres against Newcastle Disease Virus (ND) and Infectious Bursal Disease Virus (IBD) using Hemagglutination Inhibition test and ELISA, respectively. The treatment wise means of titers were calculated. The weight lymphoid organs such as spleen, bursa of Fabricius and thymus were taken during the slaughter of the birds on 45th week (peak stage of the experiment) of the experiment and expressed as percent of pre slaughter live body weight.

Table 1: Description of experimental groups

Experimental Group	Description of the treatment	No. of replicates	No. of birds per replicate	Total
T1	Basal diet	3	10	30
T2	Basal diet + 0.1% natural vitamin E	3	10	30
T3	Basal diet + 0.1% natural vitamin C	3	10	30
T4	Basal diet + 0.1% natural choline	3	10	30
T5	Basal diet + 0.1% herbal liver supplement	3	10	30
			Total	150

3. Results and Discussion

3.1 Antibody titres against new castle disease and infectious bursal disease

The results of the effect of natural vitamin E, vitamin C, choline and herbal liver supplement on antibody titers against Newcastle disease and Infectious bursal disease during 42nd day in commercial broilers were presented in Table 2.

At the end of 42nd day, the antibody titers (\log_{10} HI titer) against Newcastle disease in groups T1, T2, T3, T4 and T5 were 1.355, 1.455, 1.505, 1.505 and 1.405, respectively. ANOVA revealed no significant ($p > 0.05$) difference in antibody titers against Newcastle disease among the various treatment groups and control. The antibody titers (ELISA) against Infectious bursal disease in groups T1, T2, T3, T4 and T5 were 2221.16, 2203.5, 2266.16, 2219.33 and 2226.46, respectively. Statistical analysis revealed no significant ($p > 0.05$) difference in antibody titers against Infectious bursal disease among the various treatment groups and control. The results of antibody titres against Newcastle disease and Infectious bursal disease shows no significant ($p > 0.05$) differences between treatment groups and control group at the end of the experiment.

The results of the present study are in agreement with Kiran Kumari (2011) [7] who observed supplementation of herbal choline supplement shows no significant increase in mean serum antibody titre against Newcastle disease virus at 28 and 42 days as compared to control group. The findings of the present results are in disagreement with Kumar and Singh (2005) [8] who observed that compared to the control group, the amla fed group had significantly greater antibody titres against the infectious bursal disease and Newcastle disease vaccines over the course of the full observation period. The findings of the present results are in disagreement with Zhang *et al.* (2009) [13] who observed significantly better antibody titres against Newcastle disease in natural vitamin E

supplemented group compared to control group.

3.2 Lymphoid organ weights (% live weight)

The results of the effect of natural vitamin E, vitamin C, choline and herbal liver supplement on lymphoid organ weight at 42nd day in commercial broilers were presented in Table 3.

The weight of spleen (%) on 42nd day of the experiment in groups T1, T2, T3, T4 and T5 were 0.165, 0.162, 0.167, 0.171 and 0.171, respectively. Statistical analysis revealed no significant ($p > 0.05$) difference in weight of spleen between the treatments and control. The weight of thymus (%) on 42nd day of the experiment in groups T1, T2, T3, T4 and T5 were 0.386, 0.382, 0.387, 0.399 and 0.392, respectively. Statistical analysis revealed no significant ($p > 0.05$) difference in weight of thymus between the treatments and control. The weight of bursa of Fabricius (%) on 42nd day of the experiment in groups T1, T2, T3, T4 and T5 were 0.126, 0.123, 0.125, 0.133 and 0.132, respectively. Statistical analysis revealed no significant ($p > 0.05$) difference in weight of bursa between the treatments and control.

The results of lymphoid organs weight shows no significant ($p > 0.05$) differences between treatment groups and control group at the end of the experiment. The results of the present study are in agreement with Cheng *et al.* (2017) [3] whose results shown that the birds fed the diets supplemented with natural or synthetic forms of vitamin E had no effect ($p > 0.05$) on relative weights of spleen, thymus, and bursa of Fabricius compared with those fed the basal diet. The findings of the present results are in disagreement with Kadam *et al.* (2009) [6] who observed significant increase in immune organ weights such as bursa of Fabricius and spleen in a group supplemented with citrus lemon juice at 5 ml per 100 birds in drinking water compared to control group.

Table 2: Effect of natural vitamin E, vitamin C, choline and herbal liver supplement on antibody titers (Mean±SE) against Newcastle disease (log₁₀ HI titer) and Infectious bursal disease (ELISA) at 42nd day in commercial broilers

Treatment group	Diet	ND (log ₁₀ HI titer)	IBD (ELISA)
T1	Basal diet	1.355±0.12	2221.16±177.72
T2	Basal diet + 0.1% natural vitamin E	1.455±0.12	2203.5±148.34
T3	Basal diet + 0.1% natural vitamin C	1.505±0.10	2266.16±201.55
T4	Basal diet + 0.1% natural choline	1.505±0.10	2219.33±208.12
T5	Basal diet + 0.1% herbal liver supplement	1.405±0.10	2226.46±259.61

Table 3: Effect of natural vitamin E, vitamin C, choline and herbal liver supplement on percent relative immune organs weight (% of live weight) (Mean±SE) at the 42nd day in commercial broilers

Experimental Group	Diet	Spleen	Thymus	Bursa of Fabricius
T1	Basal diet	0.165±0.005	0.386±0.005	0.126±0.002
T2	Basal diet + 0.1% natural vitamin E	0.162±0.009	0.382±0.021	0.123±0.005
T3	Basal diet + 0.1% natural vitamin C	0.167±0.005	0.387±0.010	0.125±0.003
T4	Basal diet + 0.1% natural choline	0.171±0.009	0.399±0.157	0.133±0.004
T5	Basal diet + 0.1% herbal liver supplement	0.171±0.003	0.392±0.0	0.132±0.004

4. Conclusion

Based on the results it was concluded that natural vitamin E, vitamin C, choline and herbal liver supplement have no significant effect on antibody titres against Newcastle disease and Infectious bursal disease and also have no significant effect on lymphoid organs (spleen, bursa of Fabricius and thymus) weight.

5. References

1. BIS. Bureau of Indian Standards, Poultry Feed Specification., 5th revision Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi-11; c2007.
2. Cheng K, Niu Y, Zheng XC, Zhang XC, Zhang H, Chen YP. A comparison of natural (Dα-tocopherol) and synthetic (D L α tocopherol acetate) vitamin E supplementation on the growth performance, meat quality and oxidative status of broilers. *Asian-Austral. J.* 2016;29(5):681.
3. Cheng K, Zhang M, Huang X, Zheng X, Song Z, Zhang L, *et al.* An evaluation of natural and synthetic vitamin E supplementation on growth performance and antioxidant capacity of broilers in early age. *Canadian J. Anim. Sci.* 2017;98(1):187-193.
4. Dhuma IM, 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. *Inter. J. Livestock Research.* 2018;8(6):2277-1964.
5. Guntupalli M, Chandana V, Palpu P, Shirwaikar A. Hepatoprotective effects of Rubiadin, a major constituent of *Rubia cordifolia*. *Linn. J Ethano-Pharmacol.* 2006;103:484-490.
6. Kadam AS, Lonkar VD, Patodkar VR, Kolangath SM, TA. Bhosale. Comparative efficacy of supplementation of natural (*Citrous limon* Juice), herbal and synthetic vitamin c on the immune response of broiler chicken during summer stress. *Asian. J Poult. Sci.* 2009;3(3):57-62.
7. Kiran Kumari. Studies on comparative efficacy of herbal and synthetic methionine, choline and biotin on performance of Ven cob broiler and RIR laying chickens. Ph.D. Thesis; Indira Gandhi Krishi Vishwavidyalaya, Raipur, India; c2011.
8. Kumar M, Singh, KC. Effect of supplementation of herbal products on the production potential of chickens. XXIII Annual Conference and National Symposium of Indian Poultry Science Association, 2-4 February Hyderabad, 2005, 132.
9. Nadir Alloui Mohamed, Nabila, Amir Agabou. Application of herbs and phyto-genic feed additives in poultry production. *Global J Anim. Sci. Research.* 2014;2(3):234-243.
10. Pardue SL, Thaxton JP. Ascorbic acid in poultry: A review. *World's Poult. Sci. J.* 1986;42:107-123.
11. Sahin K, Sahin N, Gursu MF. Effects of vitamins E and A supplementation on lipid peroxidation and concentration of some mineral in broilers reared under heat stress (32°C). *Nutri. Research.* 2002;22:723-731.
12. Somavanshi SPS, Gupta R, Kaur N, Kumar A, Pandey NK. Effect of herbal liver stimulants on growth and performance of broiler chicks. *Indian. J. Extension Edu.* 2020;56(1):69-72.
13. Zhang XH, Zhong X, Zhou YM, Du HM, Wang T. Effect of RRR-α-tocopherol succinate on the growth and immunity in broilers. *Poult. Sci.* 2009;88(5):959-966.