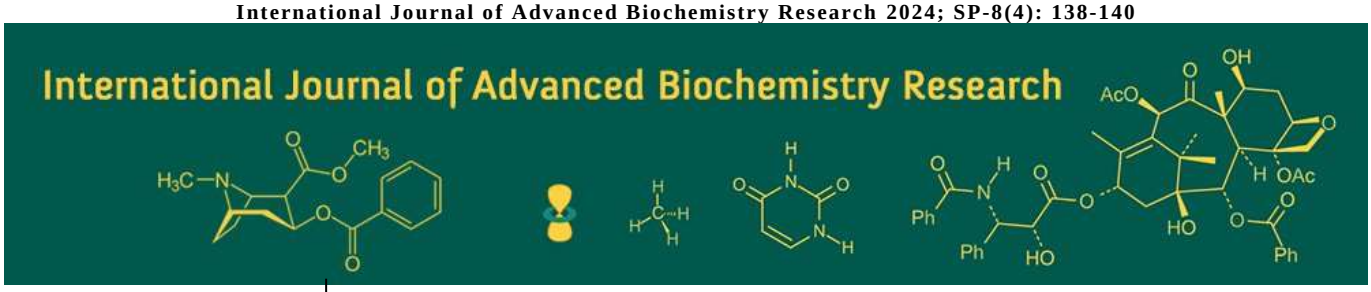

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Comparative study of ginger and garlic as feed supplements on haematological profile of broiler chickens

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Abstract
A research experiment was done to study, effects of Garlic and Ginger feed supplements over haematological profile of cobb broilers. Two hundred day old Cobb broiler chicks, then divided in one control and three treatments groups. They further divided in two replicates of 25 chicks. The first treatment group was taken as T_0 (control) while in other treatment Ginger and Garlic supplements were added. The results showed that addition of Garlic and Ginger supplementation in broilers feed have shown increased levels of all haematological profile in supplemented groups. This was due to the initiative effects of higher absorption rate of haem pigment on hematopoietic organ that have helped birds to live with maximum physiological fitness and excel in performance.

Keywords: Broiler chickens, haematological, feed supplements

Introduction
Poultry is one of the fastest growing segments of the agriculture sector in India. In 2023, the consumption of poultry meat in India was found to be over four million metric tons. To meet the growing demand, the poultry population in the country has grown at a rapid pace. The domestic poultry is expected to grow 8-10 percent in 2022-2023. India ranks 3rd in the world in egg production and 5th in chicken meat production. The growth rate of layer market is 6 to 7 percent per annum and broiler market is 8 to 10 percent per annum. In 2022, the Indian poultry market reached a value of USD 28.18 billion. Ginger and Garlic has anti inflammatory, antibacterial, antiseptic, antiparasitic, immunomodulatory, appetite stimulant prebiotic and antioxidant properties. Total body weight gain in ginger supplemented birds was higher. Garlic and Ginger are natural growth boosters. Garlic supplementation led to an increase in monocyte, lymphocyte and HDL and decrease in LDL levels. Garlic also increases in growth performance, haematological profile and meat quality. Keeping aforesaid point in view, the following study were done with the following objectives - Effect of feeding Ginger & Garlic powder supplementation on haematological parameters of broiler chickens.

Materials and Methods
Two hundred day old Cobb broiler chicks were took as research experimental chicks and divided in four groups which further divided in two replicate groups, in which each replicate had 25 broilers chicks. The broiler chicks were used in this experiment were obtained from Ambedker Nagar. The broiler chicks weight were taken at day old age and after that at weekly interval. And then transfer to poultry farm with identical management practices. The treatments were as following, the treatments T_0 contains basal diet only, while treatment T_1 contains basal diet + 0.5% Ginger, treatment T_2 contains basal diet with 0.5% Garlic and treatment T_3 contains basal diet with 0.5 percent Garlic and 0.5% Ginger. Both Garlic and Ginger which were taken in research experiment was taken fresh, washed and sliced. The sliced Ginger and Garlic were dry in sunlight and then made powdered. The Ginger and Garlic were shifted into plastic air tied container before incorporation into the feed. Haemoglobin (Hb g%) – A haemoglobinometer is an instrument used for determine the haemoglobin content of blood by spectrophometric measurement. Packed Cell Volume (PCV)- The number of RBCs is multiplied by the mean RBC volume (MCV) of the sample RBCs to calculate the volume of the red cell component of the sample.

Total Erythrocyte Count (TEC)- Haematology analyzer machine is used to perform TEC count. It performs quantitative analysis of blood elements Mean Cell Volume-MCV was estimated by automatic analyzers.
In volume automated blood cell counters, such as the coulter counter, the red cell pass one by one through small aperture and generate signal directly proportional to their volume. For statistical analysis one way ANOVA method is used.

Results and Discussion

A research experiment was done for study effects of addition of offered supplements such as Ginger and Garlic on haematological parameters of broilers. This study was for six weeks. Blood was collected for haematological parameters on 42nd day.

Total erythrocyte count

The values for total erythrocyte count from T_0 to T_3 groups were 2.16±0.04, 2.85±0.04, 3.05±0.03 and 3.15±0.01 x10^6/ µl, respectively. Maximum TEC of 3.15±0.01 x10^6/µl was found in T_3 group followed by T_2 (3.05±0.03), T_1 (2.85±0.04), and T_0 (2.16±0.04). TEC was significantly increased in the broilers of feed supplemented groups as compared to control. Minimum TEC (2.16±0.04 x10^6/ µl) was found in T_0 group.

Table 1: Impact of Garlic and Ginger Supplementation over Haematological Profile of cobb broiler chickens (42nd day)

Treatments	TEC (10^6/µl)	TLC (10^3/µl)	PCV (%)	Haemoglobin (g/dl)	MCV (fl)	MCH (pg)	MCHC (%)
T0	2.16a±0.04	26.66a±0.10	26.88a±0.03	9.45a±0.06	125.49a±0.10	44.17a±0.09	35.22^a±0.05
T1	2.85b±0.04	27.95b±0.04	29.95b±0.10	9.70a±0.03	98.55b±0.07	42.08b±0.12	34.59^a±0.09
T2	3.05c±0.03	27.70b±0.08	30.14b±0.06	10.40b±0.03	97.54b±0.05	33.63c±0.08	34.45^a±0.05
T3	3.15d±0.01	28.17b±0.06	30.38b±0.05	10.52b±0.05	96.68b±0.08	33.27c±0.04	34.32a±0.07

Total leucocyte count (TLC)

Mean values of TLC in T_0 to T_3 groups were 26.66±0.10, 27.95±0.04, and 28.17±0.06 x 10^3/ µl), respectively. Maximum TLC of 28.17±0.06 x 10^3/ µl was found on T_3 treatment group followed by T_2 (27.70±0.08), T_1 (27.95±0.04), T_0 (26.66±0.10). TLC values were increased significantly (P<0.05) on broilers of feed garlic and ginger added groups in comparision to untreated groups. Minimum TLC (26.66±0.10 x10^3/ µl) was found in T_0 untreated group. However, there could not found any significant differences in TLC value among T_1, T_2, T_3, groups of broilers.

Packed cell volume (PCV)

Mean values of PCV in T_0 to T_3 groups were 26.88±0.03, 29.95±0.10, 30.14±0.06 and 30.38±0.05 per cent, respectively. Maximum PCV value of 30.38±0.05 percent was found in T_3 group followed by T_2 (30.14±0.06), T_1 (29.95±0.10) and T_0 (29.64±0.02). PCV values was found increased significantly on broilers of feed with supplements groups in comparison to control. Minimum PCV value 26.88±0.03 per cent was found in T_0 group. However, there could not found any significant differences on mean PCV values among T_1, T_2 and T_3 groups of broilers.

Haemoglobin (Hb)

Mean values of Hb content in T_0 to T_3 groups were 9.45±0.06, 9.70±0.03, 10.40±0.03 and 10.52±0.03 g/ dl, respectively. Maximum Hb value of 10.52±0.05 g/dl was found in T_3 group followed by T_2 (10.40±0.03), T_1 (9.70a±0.03) and T_0 (9.45±0.06). Hb values was found increased significantly (p<0.05) on broilers of feed supplemented inclusion groups in comparison to control. except T_1. Minimum Hb value (9.45±0.06 g/ dl) was found in T_0 control group. However, there could not found any significant differences on Hb values in between T_0 and T_1, T_2 and T_3 groups of broilers.

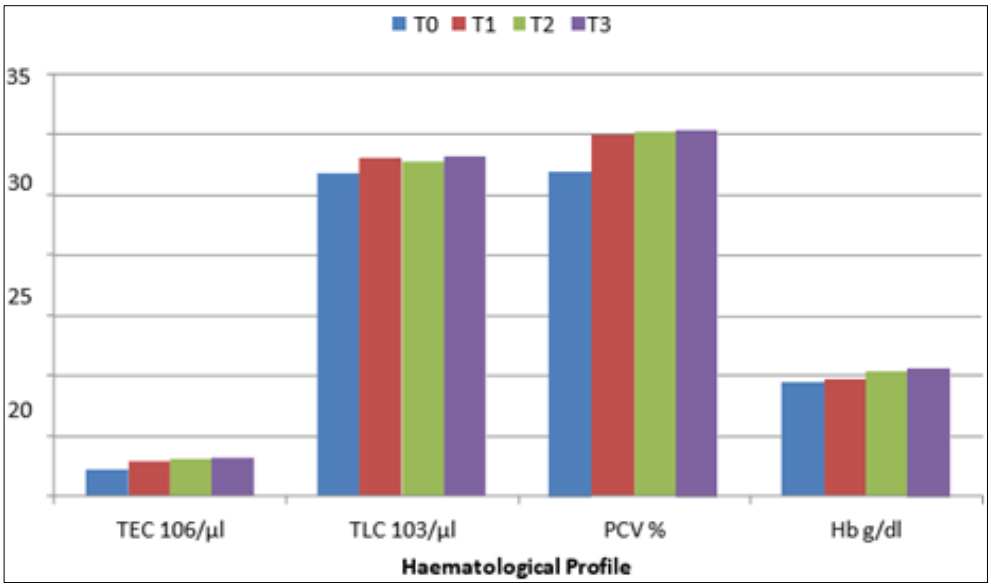

Fig 1: Impact of Garlic and Ginger Supplementation over Haematological Profile of cobb broiler chickens

Mean corpuscular volume (MCV)

Mean values of MCV in T_0 to T_3 groups were 125.49±0.10, 98.55±0.07, 97.54±0.05 and 96.68±0.08 fl, respectively. Minimum MCV value of 96.68±0.08 fl was found in T_3 group followed by T_2 (97.54±0.05), T_1 (98.55±0.07) and T_0 (125.49±0.10). MCV values found decreased significantly (p<0.05) on broilers of feed supplemented inclusion groups as compared to untreated groups. Maximum MCV value (125.49±0.10 fl) was found in T_0 (Control). However, there could not found any significant differences on MCV values among T_1, T_2 and T_3 groups of broilers.

Mean corpuscular haemoglobin (MCH)

Mean values of MCH in T_0 to T_3 groups were 44.17±0.09, 42.08±0.12, 33.63±0.08 and 33.27±0.04 pg, respectively. Minimum MCH value of 33.27±0.04 pg was found in T_3 group followed by T_2 (33.63±0.08), T_1 (42.08±0.12) and T_0 (44.17±0.09). MCH value was found decreased significantly (p<0.05) on broilers of feed supplement inclusion groups as compared to control. Maximum MCH value (44.17±0.09 pg) was found in T_0 control. However, there could not found any significant differences on MCH values in between T_2 and T_3 groups of broilers.

Mean corpuscular haemoglobin concentration (MCHC)

Mean values of MCHC in T_0 to T_3 groups were 35.22±0.05, 34.59±0.09, 34.45±0.05 and 34.32±0.07 percent respectively. Minimum MCHC value of 34.32±0.07 percent was found in T_3 group followed by T_2 (34.45±0.05), T_1 (34.59±0.09) and T_0 (35.22±0.05). MCHC values were not found decreased significantly (p<0.05) on broilers of feed supplement inclusion groups in comparison to control. Maximum MCHC value (35.22±0.05 per cent) was found in T_0 control. However, there could not found any significant differences on MCHC values among T_0, T_1, T_2 and T_3 groups of broilers. The results were found similar with Oleforuh- Okoleh *et al.* (2015) [8] they found increase significantly in Hb, PCV, TLC and TEC of the garlic and ginger supplement inclusion cobb broiler chicken. In contrast, Zomrawi *et al.* (2012) [9] who could not found any significant change on PCV, Hb, MCV, MCH, RBC, and MCHC values. George *et al*. (2015) [6] who reported hematological values as PCV and HB could not found significantly effected with supplement inclusion group. Ademola *et al.* (2009) [1] who reported non- significant effect on TEC and Hb values of the broilers. The supplement inclusion of Ginger with Garlic have favourable effect on haematological profile of birds thus leading to better growth performance of treated groups. Increased levels of haemoglobin and packed cell volume in supplemented groups might be due to the initiative effects of higher absorption rate of haem pigment on hematopoietic organ.

Conclusion

The research showed that basal diet with inclusion of Garlic + Ginger @ 0.5 g / kg feed improved performance of cobb broiler chickens in terms of haematological parameters. It is beneficial and cost effective for broiler production.

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