



**EFFECT OF DIETARY SUPPLEMENTATION OF ARJUNA (*TERMINALIA ARJUNA*)
BARK POWDER ON HEMATOLOGY OF BROILER CHICKS**

Jumman Ali Ansari^{1*}, Neeraj², Ramesh Pandey³, Ajit Singh⁴ and Sushma⁵

Sundereson School of Veterinary Science and Animal Husbandry, Sam Higginbottom Institute of Agriculture, Technology & Science (formerly Allahabad Agriculture Institute) (Deemed-to-be-University), Allahabad Uttar Pradesh.

***Author for Correspondence: Jumman Ali Ansari**

Sundereson School of Veterinary Science and Animal Husbandry, Sam Higginbottom Institute of Agriculture, Technology & Science (formerly Allahabad Agriculture Institute) (Deemed-to-be-University), Allahabad Uttar Pradesh.,

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ABSTRACT

The research was to investigate the effect of different schedules of administration of Arjuna (*Terminalia Arjuna*) bark powder on hematology of broilers chicks. A total of 72 (Arbor-Acres) day old chicks were used in this study. Four levels of a Arjuna (*Terminalia Arjuna*) bark powder at the rate of 0.00%, 0.50%, 0.75%, and 1% were incorporated into the basal diet for five weeks. Feeding period for all groups was lasted for 35 days. Relevant data was recorded throughout the experiment till the termination of experiment. Significant increase in hemoglobin concentration, and heterophils was observed in Treatment T₄. Significant decreased in lymphocyte was observed in Treatment T₄. It is concluded that schedule on the basis receiving infusion three days in a week is more potent than other schedule of research study.

KEYWORDS: Broiler, Arjuna, Hematology, hemoglobin, lymphocyte.

INTRODUCTION

In India, earlier poultry farming was only a backyard venture or occupation for the poor but now it has become a pride industry. It is one of the fastest growing segments of the agricultural sector today. The production of agricultural crops has been rising at a rate of 1.5 to 2% per annum whereas the production of eggs and broilers has been rising at a rate of 8 to 10% per annum.

Today India is world's fifth largest egg producer and the eighteenth largest producer of broilers, where chicken accounts for more than 90% of the total poultry population of the country. In 1995 poultry meat reached 0.5 million metric tones& it increased to 0.87 million metric tones in 2000 having growth rate of 11% per annum (Mehta *et al.*,2002).

The consumption and demand for medicinal plants have been adopted in many countries because of low cost, easy availability, affordability for a common farmer, good antimicrobial natured, reduced diseases associated risks, lowering blood cholesterol level and diversified functions in improving performance, growth rate, feed conversion rate and weight gain in birds (Lewis *et al.*, 2003). Medicinal plants are used in pharmaceuticals, cosmetics, and food supplements and even as traditional source of medicines because of their antitumor, antiarthritic and antithrombotic functions (Thomson and Ali, 2003).

Terminaliaarjuna, commonly known as "Arjuna" in our country is a well known human. Ayurvedic medicine as heart tonic to maintain heart health, normal blood pressure and reduction in cholesterol level. Its bark powder has significant antioxidant action that is comparable to vitamin E and anti-platelet activity.

Furthermore, scientists and researchers are trying to combat against fatal diseases in poultry through the use of medicinal plants, containing the most active ingredients to promote growth, weight gain, and immunostimulant.

MATERIALS AND METHODS

A total of 72 DOC of same hatch were randomly distributed into four groups i.e. T₁ (Control), treatment T₂, T₃ and T₄ with six sub groups comprising of three birds in each.

Table 1 Ingredient and nutrient composition of experimental diet (%DM)

Ingredients (%)	Broiler starter (0 – 21 days)	Broiler finisher (22 – 42 days)
Maize	60.00	63.00
Ground nut cake	23.11	18.00
Fish meal	13.00	15.00
Mineral mixture	3.00	3.00
Common salt	0.22	0.33
Vitamin premix (vit. A,B ₂ ,D ₃)	0.02	0.02
TM – 100	0.10	0.05
Amprosol	0.05	0.05
Nuvimin	0.05	0.55
Nutrient composition		
Moisture (%)	6.29	6.22
Crude Protein (%)	23.29	21.28
Total Ash (%)	8.02	9.34
CP	22.00	19.00
ME (Kcal/Kg)	2900	3000

Broilers in T₁ were fed diet as per NRC (1994) standard (CP 22 and ME 2900) but broilers in T₂, T₃ and T₄ were fed standard ration supplemented with 0.50, 0.75, 1 percent Arjuna bark powder. All broilers were offered feed and water adlib all time. They were housed in metal type battery cages in small animal laboratory of S.S. and AH Dairying, SHIATS Allahabad. A bulb of 15 watt was left on in each cage. Initial weight of each chick was recorded on arrival and then weekly. At the end of the experimental period, 20 birds per group were randomly selected. Blood samples from each bird were obtained by cervical dislocation. Two test tubes were prepared for each sample, one containing EDTA for hematological study and another for serum biochemistry. To get serum blood without EDTA was centrifuged at 1500 rpm for 20 minutes. Serum was aspirated by micropipette into sterile ependorpha and stored at -20°C until analysis. Blood samples (3-5ml) with anticoagulant (EDTA) were collected from wing vein at the end of experiment. Blood samples were analyzed for hematological parameter including hemoglobin (Hb) concentration, packed cell volume (PCV), Total leukocytes count (TLC) and differential leukocyte counts by the method recorded by (Benjamin, 1978). Data obtained on various parameters were tabulated and statistically analyzed using analysis of variance (ANOVA) technique as per Snedecar & Cochran (1994) in RBD.

RESULTS AND DISCUSSION

The research study was conducted to investigate the effect of different schedule of medicinal plants Arjuna bark powder infusion on hematological of broiler chicks. Means Hemoglobin estimation (Hb) level is presented in Table 2. Treatment T₄ receiving 1 % Arjuna bark

powder at the rate were incorporated into the basal diet for five weeks., showed higher (P<0.05) Hb level (14.45 g/dl) as compared to other treatment groups. The findings of the present research study are similar with the findings of Esonu *et al.* (2006), who observed significant increase in Hb level while feeding herbal plant (neem) to the laying hen. Results of our findings is in contrast with the findings of Gautam *et al.* (2004), who noticed that no significant effect on Hb was observed, fed *Withania somnifera* to the animals. Our result is in agreement with the result of Sham *et al.* (2003), who reported significant effect on hemoglobin and red cell count, while feeding *Withania somnifera* to animals. Means PCV level is presented in Table 2. Treatment T₄ receiving 1 % Arjuna bark powder at the rate were incorporated into the basal diet for five weeks showed higher PCV (31.48 %) level but non significant in between treatment. This is parallel to the findings of Esonu *et al.* (2006), who reported non significant increase in PCV level, in layers fed herbal plant neem. Means total leukocytes count (TLC) level is presented in table 2. Treatment T₄ receiving 1 % Arjuna bark powder at the rate were incorporated into the basal diet for five weeks showed higher in TLC (27.38 %) level. The findings of the present research study are parallel to the findings of Esonu *et al.* (2006), who observed significant increase in TLC level, while feeding herbal plant (neem) to the laying Hen. Finding of present study is in disagreement with the findings of Gautam *et al.* (2004), who noticed that no significant effect on lymphocyte and WBC counts was observed, while feeding *Withania somnifera* to the animals. Our result can also be comparable with the findings of Sham *et al.* (2003), who reported significant increase in white cell counts while feeding *Withania somnifera* to the mice.

Table 2. Mean±SE hemoglobin (Hb), packed cell volume (PCV) total leucocytes count (TLC) in broiler chicks dosed with supplementation of Arjuna bark powder.

Treatment	Hb (g/dl)	T.E.C.(10 ⁶ /mm ³)	P.C.V.(%)	T.L.C. (th/mm ³)
Control(T ₁)	11.57±0.2 ^a	3.12±0.4	29.98±1.1	26.73±0.7
0.50 %(T ₂)	11.98± 0.4	3.67±0.3	31.04±1.3	26.65±0.6
0.75 %(T ₃)	12.58± 0.4	3.95±0.5	31.12±1.1	26.80±0.2
1.0% (T ₄)	14.45±1.1 ^b	3.96±0.2	31.48±1.3	27.38±1.7

ab means in the same column with no common superscript differ significantly ($P \leq 0.05$).

Table 3. Mean \pm SE Heterophils, Eosinophils, Basophils, Lymphocyte and Monocyte in broiler chicks dosed with supplementation of Arjuna bark powder.

Treatment	Heterophils (%)	Eosinophils (%)	Basophils (%)	Lymphocyte (%)	Monocyte (%)
Control(T ₁)	19.29 \pm 0.3 ^a	3.62 \pm 0.1	1.40 \pm 1.5	72.03 \pm 0.2 ^a	4.60 \pm 0.1
0.50 % (T ₂)	19.74 \pm 0.5	3.08 \pm 0.5	1.57 \pm 1.3	71.04 \pm 0.9	4.70 \pm 0.2
0.75 % (T ₃)	21.32 \pm 0.2	3.65 \pm 0.1	1.60 \pm 1.2	71.04 \pm 0.1	4.75 \pm 0.4
1.0% (T ₄)	21.02 \pm 1.3 ^b	3.69 \pm 0.2	1.61 \pm 1.4	69.86 \pm 1.2 ^b	4.99 \pm 0.6

ab means in the same column with no common superscript differ significantly ($P \leq 0.05$).

Means total erythrocyte count (T.E.C.) level is presented in table 2. Treatment T₄ receiving 1 % Arjuna bark powder at the rate were incorporated into the basal diet for five weeks showed higher T.E.C (3.96 10⁶ /mm³) level but non significant in between treatment. The findings of the present research study are parallel to the findings of Esonu *et al.* (2006), who observed non significant increase in RBC level, while feeding herbal plant (neem) to the laying Hen. Means heterophils level is presented in table 3. Treatment T₄ receiving 1 % Arjuna bark powder at the rate were incorporated into the basal diet for five weeks showed higher heterophils (21.02 %) level but significant in between treatment. Means eosinophils is presented in table 3. Treatment T₄ receiving 1 % Arjuna bark powder at the rate were incorporated into the basal diet for five weeks showed higher eosinophils (3.69 %) level but non significant in between treatment. Means basophils level is presented in table 3. Treatment T₄ receiving 1 % Arjuna bark powder at the rate were incorporated into the basal diet for five weeks showed higher basophils (1.61 %) level but non significant in between treatment. Means lymphocyte value presented in Table 3. Treatment T₄ receiving 1 % Arjuna bark powder at the rate were incorporated into the basal diet for five weeks showed lower lymphocyte (69.86 %) level but significant in between treatment. Means monocyte is presented in table 3. Treatment T₄ receiving 1 % Arjuna bark powder at the rate were incorporated into the basal diet for five weeks showed higher monocyte (4.99 %) level but non significant in between treatment. It was concluded that there was a significant effect of different treatments of Arjuna bark powder supplementation in feed on significant increase in hemoglobin concentration and heterophils was observed in Treatment T₄. Significant decreased lymphocyte was observed in Treatment T₄ in broilers was observed in ration supplemented with 1.0% Arjuna bark powder. From economic point of view feed containing Arjuna bark powder 1.0% was better due to significantly lowest feed consumption and improved feed conversion ratio.

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