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**INDO AMERICAN JOURNAL OF  
PHARMACEUTICAL SCIENCES**Available online at: <http://www.iajps.com>**Research Article****EFFECTS OF DIETARY ARJUNA (*TERMINALIA ARJUNA*)  
BARK POWDER SUPPLEMENTATION ON SERUM  
BIOCHEMICAL OF BROILERS****Jumman Ali Ansari\* Ajit singh, Neeraj, Ramesh Pandey, Sushma**

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.**Abstract:**

*The research study was undertaken to investigate the effect of different schedules of administration of Arjuna (Terminalia Arjuna) bark powder serum biochemistry of broilers chicks. A total of 72 (Arbor-Acres) day old chicks were used in this study. Four levels of Arjuna (Terminalia Arjuna) bark powder at the rate of .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 decreased total cholesterol, triglycerides and LDL was observed in Treatment T<sub>4</sub>. 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, LDL, H D L, cholesterol.

**Corresponding author:****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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**INTRODUCTION:**

An important economic goal of the poultry industry is to increase the productivity. However, the productivity of this industry is threatened by climatic, physical, and social stressors [1]. High temperature in poultry-house reduces feed intake, body weight gain and feed efficiency. Furthermore, high ambient temperature causes the release of corticosterone and catecholamines. Corticoids depress immune system function, reduce serum protein concentrations and increase blood glucose concentrations which have damaging effect on poultry performances by decreasing body weight gain and egg production. Therefore, maximum production requires the elimination of the deleterious impacts of environmental stressors [1,2]. The efficacy of *T. arjuna* fractions as antidy slipidemic and antioxidant agents was found as: ethanolic fraction > diethyl ether fraction > Petroleum fraction[3]. The tannins and flavones may act as in free radical scavenging mechanism and may prevent atherogenesis in rabbit aorta. While the plant sterols may be interacted with the intestinal absorption of fats and cholesterols, it will promote the fecal elimination of the fats and cholesterols. Katan *et al.*, [4] assessed the BHUx-mediated reduction in the calcium content in the atherosclerotic plaque could also be attributed to antioxidant property or to the calcium channel blocking property of *T. arjuna*. Kaur *et al.*, and Dubey and Batra, *et al.*, [5,6] also evaluated hypolipidemic activity of methanolic extract of *Terminalia arjuna* leaves orally at 500 mg kg<sup>-1</sup> for 30 days in two hyperlipidemic rat models viz. triton injected and cholesterol and cholic acid fed models. Chen *et al.*, [7] assessed the ability of casuarinin,

extracted from *Terminalia arjuna* attenuates H<sub>2</sub>O<sub>2</sub> induced oxidative stress, decreases DNA oxidative damage and prevents the depletion of intracellular GSH in cultured Madin-Darby canine kidney (MDCK) cells. In a case control study where in *Terminalia arjuna* (100 mg) combined with *Emblca officinalis Gaertn.* (100 mg), *Ocimum sanctum L.* (50 mg) and *Withania somnifera Dunal* (50 mg) in a capsule form, was found to decrease total cholesterol and triglycerides and increase in HDL-cholesterol [8]. In another study Khalil, *et al.*, [9] found that administration of *Terminalia arjuna* bark powder along with statin for 3 months resulted in 15% decrease in total cholesterol, 11% in triglycerides and 16% in LDL-cholesterol.

**MATERIAL AND METHOD:**

A total of 72 DOC of same hatch were procured and randomly distributed into five groups i.e. T<sub>1</sub> (Control), treatments, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> with three sub groups comprising of six birds in each to serve as replicates.

Broilers in treatment T<sub>1</sub> were fed diet as per NRC standard CP 22 and ME 2900 and broilers in T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> were fed standard ration supplemented with levels of Arjuna (*Terminalia Arjuna*) bark powder at the rate of .00%, 0.50%, 0.75%, and 1%. 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.

**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 <sub>2</sub> ,D <sub>3</sub> )	0.02	0.02
TM – 100	0.10	0.05
Amprosol	0.05	0.05
Nuvinin	0.05	0.55
<b>Nutrient composition</b>		
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

**Table 2: Mean±SE Total Cholesterol, Triglycerides, High-Density lipoprotein and Low-Density Lipoprotein in Broiler Chicks with Supplementation of Arjuna (*Terminalia Arjuna*) Bark Powder.**

Treatment	Total cholesterol (mg/dl)	Triglyceride (mg/dl)	HDL (mg/dl)	LDL (mg/dl)
Control (T <sub>1</sub> ) 34.66±1.8 <sup>a</sup>		250.53±1.9 <sup>a</sup>	249.41±1.4 <sup>a</sup>	122.14±2.3
0.50 % (T <sub>2</sub> ) 33.33±2.6		246.61±2.8	246.49±2.3	123.48±4.8
0.75 % (T <sub>3</sub> ) 32.83±1.8		242.09±1.1	245.64±2.8	123.53±1.8
1.00 % (T <sub>4</sub> ) 30.59±1.3 <sup>b</sup>		238.09±3.1 <sup>b</sup>	241.28±1.4 <sup>b</sup>	124.07±2.2

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

Chicks were provided 0.8 sq.ft/bird space. Cages, feeders, waterers, and other equipments were properly cleaned disinfected and sterilized before use. The waterers were disinfected with 0.02 % KMnO<sub>4</sub> solution every day. At the end of the experimental period, 20 birds per group were randomly selected animals were killed by decapitation, and blood samples were collected in tubes. Serum was separated by centrifugation at 1700 g, at room temperature, for 10 minutes. The analyses of serum were carried out according to the manufacturer's instructions. Lipid profile including total cholesterol, Triglyceride, HDL and LDL were determination using Elitech Kit technique as described by Werner et al., [10]. Data obtained on various parameters were tabulated and statistically analyzed using analysis of variance (ANOVA) technique as per Snedecar & Cochran [11] in RBD.

### RESULT AND DISCUSSION:

The research study was conducted to investigate the effect of Arjuna (*Terminalia Arjuna*) bark on biochemical of broiler chicks. Significant ( $P < 0.05$ ) differences in the mean serum total cholesterol, triglyceride and low density lipoprotein (LDL) values were recorded among the treatments presented in Table 2. Means Total cholesterol level is presented in table 2. Treatment T<sub>4</sub> receiving 1.0 % feed of Arjuna (*Terminalia Arjuna*) bark at the rate was incorporated into the basal diet for five weeks showed lower total cholesterol (238.09 mg/dl) level but significant in between treatment. Means Triglyceride level is presented in table 2.

Treatment T<sub>4</sub> receiving 1.0 % feed of Arjuna (*Terminalia Arjuna*) bark at the rate was incorporated into the basal diet for five weeks showed lower triglyceride (241.28 mg/dl) level but significant in

between treatment. Our findings are supported the observation of Jayant and Dhuley [12], who reported that ashwagandha (*Withania somnifera*) prevented the rise in LPO in rabbit and mice and Babu et al. [13], who fed herbal plant to diabetic rats and found low value of serum cholesterol and serum triglyceride. Result of our findings are comparable with the findings of Nishant et al., [14], who reported that *Withania somnifera* significantly ( $P < 0.05$ ) lowered the cholesterol in hypercholesteremic male albino rats. Result of our findings are relevant to the result of Andallu and Radhika [15], who reported significant decrease in cholesterol and triglycerides in hyperlipidemic rats, while feeding *Withania somnifera* extract to the mice. Means High density lipoprotein (HDL) level is presented in table 3. Treatment T<sub>4</sub> receiving 1.0 % feed of Arjuna (*Terminalia Arjuna*) bark at the rate was incorporated into the basal diet for five weeks showed higher HDL (124.07 mg/dl) level but non significant in between treatment. Result of our findings are opposed by the findings of Nishant et al., [14], who reported that *Withania somnifera* significantly ( $P < 0.05$ ) increased the HDL in hypercholesteremic male albino rats. Mean serum low-density lipoprotein (LDL) values were found significant among the treatments presented in Table 2. The lower serum low density lipoprotein value was recorded in treatment T<sub>4</sub> than control. The results of present study are in agreement with result of Babu et al., [13], who fed herbal plant, cur cumin to diabetic rats and found low values of serum LDL. It was concluded that there was a significant effect of different treatments of Arjuna (*Terminalia Arjuna*) bark supplementation in feed on significant decreased total cholesterol, triglyceride and LDL was observed in Treatment T<sub>4</sub> in broilers was observed in ration supplemented with 1.0 % feed of Arjuna (*Terminalia Arjuna*) bark. From economic

point of view feed containing 1.0 % feed of Arjuna (*Terminalia Arjuna*) bark was better due to significantly lowest feed consumption and improved feed conversion ratio.

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