



## EFFECT OF *TERMINALIA CHEBULA* POWDER ON BROILER PRODUCTIVE TRAITS AND SOME BIOCHEMICAL PARAMETER

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### ABSTRACT

The present research was aimed to study the effect of *Terminalia chebula* (*T. chebula*) powder on some productive and biochemical traits of the broilers. 200 one-day-old chicks (Ross 308) were randomly divided into four equal groups (50 of each) with two replicates. All the chicks were reared in farm of Veterinary Medicine College/ University of Baghdad for 35 days from 2 November 2016 up to 7 December 2016. The 1<sup>st</sup> group: - Given 500 mg / kg. feed of *Terminalia chebula* powder 2<sup>nd</sup> Group: - Given 750mg/ kg. feed of *Terminalia chebula* powder 3<sup>rd</sup> Group: - Given 1000 mg/ kg. feed of *Terminalia chebula* powder 4<sup>th</sup> Group: - control negative fed on basil diet. Body weight, weight gain, feed intake and feed conversion ratio were recorded; blood samples were collected to measure blood parameters at 35 days. The results of the 3<sup>rd</sup> group recorded significant ( $P < 0.05$ ) increase in RBC ( $3.73 \pm 0.007$ ) Hb ( $22.37 \pm 0.46$ ) as compared with the 1<sup>st</sup>, 2<sup>nd</sup>, and control groups at aged 35 days. The results also showed significant reduction in H/L ratio of 3<sup>rd</sup> and 2<sup>nd</sup> groups at the same time improving the live body weight gain and feed consumption were statistically significant ( $P < 0.05$ ) compared with control group (G4). In conclusion, dietary *Terminalia chebula* supplementation has improved the some hematological and productive parameters of broilers.

**KEYWORDS:** *Terminalia chebula*, growth performance, broiler, blood cells.

### INTRODUCTION

Poultry business produces an extremely nutritive food for human consumption in a short amount and has become a very important economic activity in several countries. Medicinal plants are part and parcel of human society from the dawn of civilization to combat diseases and have been considered valuable and cheap source of unique Phytoconstituents which are used extensively in the development of drugs against various diseases<sup>[1,2,3]</sup>. *Terminalia chebula* could be a moderate tree used in traditional medicines. It belongs to the combretum family. It's usually known as Black myrobalan plum, Ink tree (or) *Chebulic myrobalan*. It's extensively utilized in Unani, piece of writing and medical aid drugs. *Terminalia chebula* may be a well-liked ancient drugs not solely utilized in Asian nation however conjointly in alternative countries of Asia and Africa. This is often utilized in ancient drugs thanks to the wide spectrum of pharmacological activities related to the biologically active chemicals present during this plant. It's used for the treatment of variety of diseases like cancer, paralysis, cardio vascular diseases, ulcers, leprosy, arthritis, gout, encephalopathy etc. it's been reportable as inhibitor<sup>[4]</sup>, anti-diabetic<sup>[5]</sup>, antibacterial<sup>[6]</sup>, antiviral<sup>[7]</sup>, anti cancerous, antifungal, agent, antiulcer, wound healing activities etc. The aims of this study to evaluate the effect of different concentrations of *Terminalia chebula* on the productive performance after adding to broilers feed and Study the effect of *Terminalia chebula* on health performance (blood pictures).

### MATERIALS & METHODS

#### Chicks of the study

Two hundred broiler chicks (Ross 308) at one day old were used in our experiment. One-day age is not homogenized. Chicks were obtained from commercial hatchery of Baghdad province.

#### Study area

All chicks were reared in farm of Veterinary Medicine College/ University of Baghdad for 35 days, started from 2 November 2016 up to 7 December 2016.

#### Experimental deign

Two hundred chicks were randomly divided into four equal groups at 50 chicks of each group with two replicates (25 chicks of each replicate). All birds in this study were offered feed and water *ad libitum*. The 1<sup>st</sup> group: - Given 500 mg / kg. feed of *Terminalia chebula* powder 2<sup>nd</sup> Group:- Given 750mg/ kg. feed of *Terminalia chebula* powder 3<sup>rd</sup> Group: - Given 1000mg/ kg. feed of *Terminalia chebula* powder 4<sup>th</sup> Group:- control negative fed on basil diet. The feeding program consisted of a starter diet used for the first 21 day of age and a finisher diet till 35 day of age. All diets for each period were prepared with the same batch of ingredients, and all diets within a period had the same composition. Diets were formulated to meet or exceed requirements by the

#### Vaccines

Vaccines used: manufactured by Volvac® (Boehringer Ingelheim- HQ Germany). All chicks were vaccinated as in (Table 1).

**TABLE 1:** Vaccination program adopted in the present study

Age/Day	disease	Type of vaccine	Administration rout
9	ND+IB	Volvac® ND-IB MLV (Boehringer Ingelheim- HQ Germany)	Via Drinking water
14	Gumboro	Volvac® IBD MLV (Boehringer Ingelheim- HQ Germany)	Via Drinking water
18	ND+IB	Volvac® ND-IB MLV (Boehringer Ingelheim- HQ Germany)	Via Drinking water

**Diets used**

The starter diet was applied for 21 days of old, then the grower diet offered up to end of the experiment, the yellow corn and wheat were the major sources of energy, while the soybean and animal protein were the major sources of protein in this diets. Nutritional requirements were adjusted according to the NRC<sup>[8]</sup>.

**Sampling**

**Collection of Samples**

At age 35 days old of bird, the blood samples were collected randomly from the jugular vein (10 chicks from each group) for estimation of the some biochemical tests.

**Preparation of samples**

Two types test tubes were used, the first type with anticoagulant (K3-EDTA) to measure the Erythrocytes and leukocytes counts, PCV%, Hemoglobin concentration and Heterophil/ Lymphocyte ratio<sup>[9]</sup>.

**Productive Parameters**

Weekly body weights: - The chicks were weighed individually, 35<sup>th</sup> days. The live body weights for each treatment were recorded.

Weekly weight gains: - The weekly body weight gain was calculated: Weekly weight gain (gm.) = body weight at the end of the week-body weight at the beginning of the week.

Weekly feed consumption: - Feed intake was measured weekly depending on equation mentioned by <sup>[10]</sup> and that was done by weighing remained feed at lad it from the total quantity offered at the end of each week and subtracted it from the total quantity offered at the beginning of the week taking into consideration the number of the dead chicks and the number of their feeding days

Weekly feed conversion ratio:- Weekly feed conversion ratio was measured for each group in the experiment as the equation mentioned by <sup>[10]</sup>.

**Statistical analysis**

The data was performed using SAS program (Statistical Analysis System- version 9.1). One-way and two-way ANOVA with Least significant differences (LSD) post hoc test were performed to assess significant differences among means. (P 0.05) was considered statistically significant <sup>[11]</sup>.

**RESULTS & DISCUSSION**

Results presented Table 2 and 3 revealed significant (P 0.05) increases between the experimental groups. The third group (G3) (187.45g) was significantly higher than the other groups, especially the second group (G2) and the first (G1) (179.0 g/ 170.45g) respectively compared with control group (G4). These significant increases continued until the fifth week (35 days). The treatment of *Terminalia chebula* powder resulted in a significant increase in live body weight and weekly weight gain, especially in the third group as compared to other groups. In addition, the third group recorded the highest rate of increase of weekly weight during the period (2-5) weeks. The results showed significant respectively difference in the mean live body weight and weekly weight gain at level (p<0.05) between treatment groups and control group at the different periods. The highest mean live body weight of the third group was significantly (p< 0.05) increased compared with the second, first and third groups. This increase may be due to the fact that *Terminalia chebula* powder increases the blood flow in the mucous membrane of the gastrointestinal tract and thus increases the consumption and utilization of nutrients <sup>[12]</sup>. It also stimulates appetite and promotes digestion<sup>[13]</sup>. Phytochemical analysis of *Terminalia chebula* shows the presence of gallic acid, ellagic acid, tannic acid, ethyl gallate, chebulic acid, chebulagic acid, corilagin, mannitol, ascorbic acid (vitamin C), and other compounds. One source lists *Terminalia chebula* as having 32% tannin content <sup>[14]</sup>.

In table (3) shows significant differences in weekly feed consumption between (G3) and (G2) at age 35 days. The third group showed significant differences (P <0.05) in feed consumption values of the length of the experiment compared to the first and fourth groups respectively, showing a significant decrease (P<0.05) in feed consumption rate its lowest consumption of feed in the fifth weeks were recorded (977.50 gm.) respectively. While the fourth group (G4) recorded the highest consumption of feed during the experiment compared with the other groups (1384.0 gm.) respectively.

Feed conversion ratio shows significant differences in the third group (P <0.05) compared to the first and fourth groups, respectively. Where the third group showed the best value of the feed conversion ratio (1.14)

**TABLE 2:** Effect of *Terminalia. Chebula* powder on the life body weight and Weight gain at the 35 days (gm.). Means  $\pm$ SE

Groups	G1 <i>Terminalia chebula</i> 500mg/kg. feed	G2 <i>Terminalia chebula</i> 750mg/kg. feed	G3 <i>Terminalia chebula</i> 1000mg/kg. feed	G4 Control negative (Basal diet)
Feed intake	1191.00 $\pm$ 44.54 b	1097.50 $\pm$ 39.63 c	977.50 $\pm$ 37.87 d	1384.00 $\pm$ 61.33 a
Feed conversion ratio	1.48 $\pm$ 0.08 b	1.31 $\pm$ 0.04 b	1.14 $\pm$ 0.05 c	1.82 $\pm$ 0.09 a

Means with different small letters in the same row significantly different (P < 0.05).

**TABLE 3:** Effect of different levels of *T. chebula* powder on Feed intake (g/bird) and feed conversion ratio (Means  $\pm$  SE)

Groups	G1 <i>Terminalia .chebula</i> 500mg/kg. feed	G2 <i>Terminalia .chebula</i> 750mg/kg. feed	G3 <i>Terminalia .chebula</i> 1000mg/kg. feed	G4 Control negative (Basal diet)
Body weight	2373.45 $\pm$ 32.78 c	2451.40 $\pm$ 22.87 b	2541.65 $\pm$ 31.75 a	2170.00 $\pm$ 33.23 d
Weight gain	804.55 $\pm$ 22.32 c	839.00 $\pm$ 18.77 b	852.85 $\pm$ 20.12 a	760.50 $\pm$ 16.43 d

Means with different small letters in the same row significantly different (P < 0.05).

In the current study these results showed significant differences in feed intake and feed conversion ratio at level (p< 0.05) between treatment groups compared with control group at different periods. The third group recorded a significant (p<0.05) decreased in feed intake and improved in feed conversion ratio at the all weeks of age as compared with the second ,first and control groups. In terms of consumption of feed and feed conversion efficiency, the result showed a significant increase and it was higher in the third group as compared with the other groups. This may be due to the fact that the cleavage of the *Terminalia chebula* is a highly nutritious substance. In addition, the amino acids contained in the *Terminalia chebula* powder help in the work of the glands and the structural functions of the body, especially hormones and

growth factors [15]. In addition, the flavonoids a component of *Terminalia chebula* powder, play an important role if these compounds (HDL) and red blood cells against many oxidative stress factors through the mechanical elimination of the free radicals of oxygen or hydroxyl associated with it [16,17]. In Ayurveda medicine *Terminalia chebula* is a commonly used agent for improving gastrointestinal motility. With Charles Foster rats gastric emptying was measured. Rats given *Terminalia chebula* (100 mg/kg/day) increased their gastric emptying with 86.57  $\pm$ 6.65 % (p<0.01) compared with normal rats (51.6 $\pm$ 7.79 %). From this study *Terminalia. Chebula* can serve as an alternative to prokinetic drugs available today [18].

**TABLE 4:-** Mean  $\pm$  Standard Error of Red Blood Cells count (Cell x 10<sup>6</sup>/ml), White Blood Cells count (Cell x 10<sup>3</sup>/ml), Packed Cells Volume (%), Hemoglobin concentration (g/dl) and Heterophil /Lymphocyte ratio of Blood in different groups

Groups	PCV (%)	Hb g/100ml	RBC x10 <sup>6</sup> /ml	WBC x 10 <sup>3</sup> /ml	H/L Ratio
G1 <i>T. chebula</i> 500mg/kg. feed	31.30 $\pm$ 0.55 b	16.67 $\pm$ 0.22 c	3.19 $\pm$ 0.005 c	16.30 $\pm$ 0.53 c	0.87 $\pm$ 0.01 b
G2 <i>T. chebula</i> 750mg/kg. feed	37.70 $\pm$ 0.61 b	18.64 $\pm$ 0.29 b	3.56 $\pm$ 0.01 b	18.90 $\pm$ 0.56 b	0.78 $\pm$ 0.01 c
G3 <i>T. chebula</i> 1000mg/kg. feed	44.70 $\pm$ 0.81 a	22.37 $\pm$ 0.46 a	3.73 $\pm$ 0.007 a	21.30 $\pm$ 0.51 a	0.72 $\pm$ 0.008 d
G4 Control negative (Basal diet)	28.20 $\pm$ 0.51 d	12.12 $\pm$ 0.35 d	3.01 $\pm$ 0.02 d	13.50 $\pm$ 0.60 d	0.99 $\pm$ 0.01 a
L.S.D.	1.8259	0.9934	0.0382	1.5969	0.0416

Means with different small letters in the same column significantly different (P<0.05)

ALL these result for *Terminalia chebula* that improve body weight, weight gain, feed intake and feed conversion ratio its agreement with [19]. That found wean used *Terminalia chebula* (Test medicine were administered within the dose of 550 mg/kg and analysis on enteral

transit time was meted out by adopting kaolin expulsion take a look at in mice. The results show that each the dose varieties of *Terminalia chebula* considerably Improved Digestion and higher epithelial duct Health often taking the herb *Terminalia chebula* (Haritaki) will enhance the

operate of your alimentary tract, support a healthy enteric environment and increase the absorption of nutrients from the feed you eat. At a similar time, *Terminalia chebula* powder could be a delicate laxative, up elimination, notifying the colon, clearing away compacted waste and serving to stop constipation. This study showed it's a 'significant enteral motility-enhancing effect' and might be a really helpful aid keeps gut movements regular.

Table (4) showed red blood cells (RBC), packed cell volume (PCV) hemoglobin (Hb) and white blood cell count (WBC) significantly (p 0.05) increase in (G3) and (G2). In G 3 the number of RBC was ( $3.73 \times 10^6 / \text{ml}$ ), PCV (44.70 %), Hb (22.37 g/ 100 ml), WBC ( $21.30 \times 10^3 / \text{ml}$ ), while In G 2 the number of RBC were ( $3.56 \times 10^6 / \text{ml}$ ), PCV ( 37.70 %), Hb (18.64g/100 ml ),WBC (  $18.90 \times 10^3 / \text{ml}$  ) compared with G1and G4 in G1 the number of RBC ( $3.19 \times 10^6 / \text{ml}$ ), PCV ( 31.30 % ), Hb( 16.67 g/ 100 ml ), WBC ( $16.30 \times 10^3 / \text{ml}$ ), while the H/L ratio of G1 and G4 showed significantly (p 0.05) higher than those G3 and G2. However G1 showed significantly (p 0.05) higher RBCs than those G4. While H/L ratio of G1 showed significantly (p 0.05) lower values than those of G4. However G3 those feed *Terminalia chebula* powder established significantly (p 0.05) higher values in there P.C.V., Hb, RBCs, than those of G2, G1 and G4 respectively.

The significant increase for RBCs, WBCs, P.C.V., hemoglobin because of positive changes Production performance and health standing of birds treated with *Terminalia chebula* powder, specifically exaggerated bodyweight, weight gain, feed consumption, and feed conversion ratio. *Terminalia chebula* are highly nutritious for human health as they contain various vitamins, minerals and proteins. They are an excellent source of vitamin C. These fruits are also rich in several minerals including selenium, potassium, manganese, iron and copper. The improvement in growth and metabolism requires significant changes in the components and active blood components<sup>[20]</sup>. Flavonoids compounds, one of the parts of the *Terminalia chebula* powder, play very important and vital role in strengthening health and reducing the chance of illness as a result of they play a vital role as extremely effective inhibitors supply this part could also be stifled of lipid peroxidation and multiplied level of antioxidant enzyme's<sup>[21]</sup>. Additionally to, the compounds found within the plant stimulate and promote the formation of red blood cells within the biological process as a results of stimulation and activation of the liver through the assembly of activated enzymes, that successively stimulates the kidneys on the secretion of the endocrine glycoprotein, Blood composition. This is the reason for the increase in the values of cell size (PCV) as this measurement depends mainly on the formation of red blood cells and increasing the number of red blood cells would contribute to increase the concentration of hemoglobin (Hb)<sup>[20]</sup>.

## CONCLUSION

From the results of this study, it can be concluded that dietary *Terminalia chebula* powder supplementation have improved the some hematological and productive traits of broiler chicks.

## ACKNOWLEDGMENTS

Authors would like to thank all staff in department of microbiology and medicine / college of Veterinary medicine who gave us a hand in their laboratories.

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