

THE INFLUENCE OF AQUEOUS EXTRACT OF *TAMARINDUS INDICA* PULP ON HAEMATOLOGICAL AND SERUM BIOCHEMICAL INDICES OF HUBBARD BROILER CHICKENS

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Abstract

This study was conducted to evaluate haematological and serum biochemical indices of broilers following addition of aqueous extract of *Tamarindus indica* pulp in drinking water. One hundred and eighty (180) day old broiler chickens were randomly allocated to four (4) treatments with three replicates each. Treatment one (T1) had zero level of aqueous extract *Tamarindus indica* while treatment two (T2) were given 250g of aqueous extract *Tamarindus indica*, Treatment three (T3) 350g of aqueous extract *Tamarindus indica* and Treatment four (T4) was given 450g of aqueous extract *Tamarindus indica* administered in five (5) litres of drinking water once. Parameters measured haemoglobin, packed cell volume, total white blood cell, red blood cell, blood glucose, Aspartate amino transferase, Alanine amino transferase, Total protein, Albumin and Cholesterol. The result obtained showed Packed cell volume of broilers T1, T2 and T4 were significantly ($P < 0.05$) different from T3. The result on serum biochemistry revealed that blood glucose, aspartate amino transferase and Total protein were significantly ($P < 0.05$) different among the treatment groups except alanine amino transferase, albumin and cholesterol that were not significantly ($P > 0.05$) different among the treatment groups. In conclusion, birds could be given aqueous extract of *Tamarindus indica* at higher dosage (459g) to enhance performance.

Keyword: Influence, Aqueous Extract, *Tamarindus indica*, haematology, serum biochemical, Broiler

Introduction

Background of the Study

Poultry production in Nigeria needs more improvement in order to meet up with the fastest protein demand of the country, and as such the use of natural plants which contain high levels of vitamin C, antimicrobial and antifungal properties such as *Tamarindus indica* (pulp) can serve as a replacement for some of the synthetic antibiotics which have side effects on broiler chickens. Tamarind (*Tamarindus indica* L.) is a tree which is indigenous to tropical Africa where it still grows wild (El-Siddiget *al.*, 2006). The fastest means of assessing the clinical and nutritional health status of animals on feeding trials may be the use of blood analysis, because ingestion of dietary components have measurable effects on blood composition (Maxwell, 1990) and may be considered as an appropriate measure of long

term nutritional status (Olabanjiet *al.*, 2008). The dearth of information on the possible effect of using pulp extract of *Tamarindus indica* on haematological and serum biochemical parameters of broiler chickens is the justification for the present study. The aim of the study is to evaluate the effect of aqueous extract of *Tamarindus indica* pulp on haematological and serum biochemical parameters of broiler chickens.

Materials and Methods

Experimental site

The experiment was conducted at the Teaching and Research farm, Federal University of Technology, Minna, Gidan Kwano campus, Niger State. Minna is located between latitude 9°32' N and 9°42' N and longitude 6°30' E and 6°40' E. The daylight temperatures vary from 24°C at the middle of wet season to above 35° at the peak of the dry

season. The mean annual rainfall is about 1334 mm (53 inches).

Animals and the Source

One hundred and eighty days old mixed sex hubbard broiler chicks obtained from Bounty Harvest Agro services, Ibadan was used for the experiment.

Source of Tamarind

The Tamarind was purchased from Kure Ultra-Modern market Minna, Niger state.

Preparation of aqueous extract of *Tamarindus indica*

The Tamarind was soaked in water for 1hour, to facilitate the removal of the seed in the fruit. The pulp extract was then blended in other to obtain a homogenous mixture. The homogenous mixture was sieved and filtrate was diluted with 5 litres of water.

Experimental Design

Completely Randomized Design (CRD) was used for this study. The experimental birds were allotted to four Treatments and three replicates per treatment; with 45 and 15 chicks in each treatment and replicate respectively. The treatment were designated as T1 control (0g), T2, T3 and T4 containing 250 g, 350 g and 450 g of Tamarind pulp diluted with 5 litres of water respectively.

Management of the Research birds

The pens were disinfected with a germicide, cobwebs was removed and swept out and prior to the chick's arrival the drinkers and feeders were thoroughly washed and sun dried. The chicks were allowed to acclimatize to the environment for the period of one week during which multivitamin (vitalyte) was administered to the birds. Charcoal pots were used as a source of heat during the brooding period. Feeding was done *ad libitum* for the first four weeks. Gumboro and Lasota vaccines were administered to the birds.

Data Collection

At the end of the fourth week, three birds was randomly selected from each treatment for blood samples collection using a sterile

syringe via the femoral vein into sterile bottles containing anti-coagulant Ethylene Diamine Tetra-Acetic acid (EDTA) for haematological studies and blood samples for serum biochemistry was collected into sterile bottles without anti-coagulant. Packed cell volume was determined by microhaematocrit method (Igene and Iboh, 2004); haemoglobin concentration was measured spectrophotometrically using SP6-500 UV Spectrometer. The red blood cell and white blood cell counts were estimated using Neubaur counter (haemocytometer) as reported by (Abdulazeezet *al.*, 2016).

Total serum protein was determined using Biuret method (Reinhold, 1953) as described by Kohn and Allen (1995), while albumin was determined using Bromocresol Green method (Abdulazeezet *al.*, 2016).

Statistical Analysis

The data obtained on haematological and serum biochemical parameters were subjected to one-way Analysis of Variance (ANOVA) using Statistical Analysis System (SAS, 2012). The mean difference was separated using Duncan Multiple Range Test.

Result

Effects of Aqueous Extract of *Tamarindus indica* on Haematological Parameters of Starter Broiler Chickens

The effects of aqueous extract of *Tamarindus indica* on haematological parameters of Hubbard broiler chickens is presented in Table 1. The results revealed showed that Packed cell volume of broilers T1, T2 and T4 were significantly ($P < 0.05$) different from T3. The result obtained for the total white blood cell and red blood cell of the chickens showed that the birds T1, T2 and T4 were statistically ($P > 0.05$) similar but significantly ($P < 0.05$) different from T3

Effects of Aqueous Extract of *Tamarindus indica* on Serum Biochemical Parameters of Starter Broiler Chickens

The result of the effects of aqueous extract of *Tamarindus indica* on serum biochemical parameters of starter broiler chickens is presented in Table 2. The results revealed that



blood glucose, aspartate amino transferase and Total protein were significantly ($P < 0.05$) different among the treatment groups except alanine amino transferase, albumin and cholesterol that were not significantly ($P > 0.05$) different among the treatment groups. However, the value obtained for birds in T2 was significantly similar to the values obtained from birds in T1 and T3. The result of total protein revealed that the values obtained from the birds given 250 g and 450 g were the highest ($P > 0.05$) but were also

significantly different ($P < 0.05$) from the values of birds given 0 g and 350 g of *Tamarindus indica*. The result of blood glucose of birds given 450 g of *Tamarindus indica* was not significantly ($P > 0.05$) different from birds given the control and 250 g of *Tamarindus indica*. However, the birds given 350 g of *Tamarindus indica* was significantly ($P > 0.05$) similar to the birds given the control and 250 g of *Tamarindus indica*

Table 1: Haematological parameters of starter broiler chickens given aqueous extract *Tamarindus indica* in drinking water

Parameters	T1	T2	T3	T4	SEM
Hb (g/dl)	6.60 ^a	8.97 ^a	3.40 ^b	7.97 ^a	0.02
PCV (%)	15.67 ^a	15.67 ^a	9.00 ^b	18.00 ^a	0.02
TWBC (%)	37.77 ^{ab}	54.60 ^a	16.60 ^b	46.10 ^a	0.02
RBC (%)	0.95 ^{ab}	1.50 ^a	0.75 ^b	1.57 ^a	0.05

^{ab}: Means within the same rows with different superscript are significantly different ($P < 0.05$) T1 = Control (0), T2 = 250g/5L, T3 = 350g/5L, T4 = 450g/ 5 L, SEM = Standard Error of Mean

Table 2: Serum biochemical parameters of starter broiler chickens given aqueous extract of *Tamarindus indica* in drinking water

Parameters	T1	T2	T3	T4	SEM	LS
Blood glucose (mmol/l)	8.97 ^{ab}	8.40 ^{ab}	6.60 ^b	9.50 ^a	0.05	*
SGOT (mmol/l)	320.67 ^{ab}	255.00 ^b	465.67 ^{ab}	510.07 ^a	0.05	*
SGPT (mmol/l)	46.20	40.90	43.87	40.60	0.4	NS
Total protein (g/dl)	2.47 ^c	5.00 ^a	3.80 ^b	5.00 ^a	0.01	*
Albumin (g/dl)	1.70	1.87	1.55	1.27	0.33	NS
Cholesterol (mmol/l)	2.80	3.20	2.50	3.00	0.22	NS

^{abc}: Means within the same rows with different superscript are significantly different ($P < 0.05$) AST (SGOT): Aspartate amino transferase, ALT (SGPT): Alanine amino transferase

Discussion

The results of the haematological parameters of starter broiler chickens in this research revealed that, haemoglobin, packed cell volume, total white blood cell, and red blood cell were significantly ($P < 0.05$) different among the treatment groups. These followed the same trend as observed and studied by Duwa *et al.* (2014) who stated that inclusion of aqueous extract of *Tamarindus indica* in the drinking water of the birds will result in better iron salt absorption from the small intestine and better production of Vitamin B which affects positive blood-cell forming processes (Abdulazeez *et al.*, 2016). Red blood cell and packed cell volume in this study were high at highest in T4. The result of serum biochemical parameters revealed that total protein was significantly ($P < 0.05$) different in all the treatment groups, which is similar to the result reported by Duwa *et al.* (2014). Total protein was highest in T4. Blood glucose was high in T4, which may probably be due to the stressing moment during the blood sampling as Thrall (2007) reported. The aspartate amino transferase values obtained suggest normal status of the liver function.

Conclusion

In conclusion, 450g/ 5 L of *Tamarindus indica* aqueous extract can be added to the drinking water of boiler chicken without any negative effect. It showed that *Tamarindus indica* aqueous extract treatment improved and moderated the haematological parameters of starter broiler chickens in terms of haemoglobin, packed cell volume, total white blood cell and red blood cell at 450 g inclusion level.

Recommendation

It can be recommended that 450 g of *Tamarindus indica* aqueous extract can be used for starter broiler chickens starter broilers drinking water for improved haematological and serum biochemical performance.

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