

## BLOOD PROFILE AND ORGANS WEIGHT OF BROILER CHICKENS ADMINISTERED WITH *AZADIRACHTA INDICA* EXTRACT

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### Abstract

120 broiler chicks were used in the evaluation of the effect of neem leaf extract *Azadirachta Indica* administered in water on blood biochemistry and organ weight of broilers. The experiment was designed as a complete randomized design in 4 treatment groups designated T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> with 30 birds in each group. All measured biochemical parameters were not significantly different. All organ weights measure was not significantly different except for lungs and liver. The general conclusion is that neem leaf extract pose no significant threat to growing broiler birds and have the potential of replacing synthetic antibiotics in broiler production.

**Key words:** *Azadirachta Indica*, blood biochemistry, broiler, organ weight.

### Introduction

The production of healthy birds in terms of high weight gain, quality meat and eggs without harmful residues, within a short time interval is becoming a major concern to poultry farmers. The use of synthetic drugs as antibiotics and growth promoters contributes additional cost to poultry and poultry products production. The use of synthetic antimicrobials in feed and water of to enhance growth performance and to prevent diseases is costly and leave accumulative residues in meat and eggs which could be harmful to human health (Jawad *et al*, 2014). The demand for residue free poultry products has triggered the search for alternatives means to producing cheaper birds, with the use of natural growth promoters that will not prevent the attainment of marketable weight within a short period of time and high quality meat and eggs safe for human consumption.

A good number of herbs and plants parts ranging from leaves meal and extracts, seeds, fruits and tree backs have been used in researches as alternatives to the conventional feeds, feedstuff, growth promoters and antibiotics (Xue and Meng, 1996; Wang *et al.*, 1998; Cowan, 1999; Windisch and Kroismayr, 2006; Cross *et al.*, 2007; Sese *et al.* 2013; Alikwe *et al.* 2013, Nodu *et al.* 2014). Recent researches conducted on *Aspilia Africana*, *flamboyant seeds*, bitter kola, *Amarathus cruentus*, *Mucuna utilis*, *Azadirachta indica*, *Curcuma longa* and *Cinnamomum zyleneicum* and a host of others have been successfully used as supplement in enhancing health and performance of livestock particularly monogastric, including poultry (Obun and Ayanwale, 2008, Egena *et al*, 2008, Asiegwe *et al*, 2008, Rahman *et al*, 2014). Majority of medicinal plants leave no residues and have no adverse effects (Tipu *et al.* 2006).

Neem (*Azadirachta Indica*) popularly known in

Nigeria as *Dogonyaro* is a fast growing tree that thrives well in all parts of Nigeria even in poor shallow, stony or sandy soils where agriculture crops give low yield (Jennifer, 2013). Neem tree as one of the most researched tree in the world, has attracted world-wide recognition due to its vast range of medicinal potentials like antibacterial, antiviral, antifungal, Antiprotozoal, Hepatoprotective and various other properties without showing any adverse effects (Kale *et al.* 2013).

Blood profiles are important indices of physiological state of animals (Khan and Zafer, 2005). The serum biochemical and hematological features have attracted many workers to look at their indices in order to make clinical predictions of the health status of a particular animal or a bird. The blood picture varies with certain conditions such as stress, infections and toxicity as blood constituents provide valuable media for clinical investigations and nutritional evaluation of an animal (Aderemi, 2001; Khan and Zafer, 2005).

This study was conducted to evaluate the broad effect of the inclusion of different concentrations of Neem leaf extract in the water of broiler birds on blood profile and organs weight of broiler chickens administered neem extract at different concentration.

### Materials and Methods

#### Experimental Site

This experiment was conducted at the poultry unit of the teaching and research farm of Niger Delta University Wilberforce Island, Bayelsa State of Nigeria. Wilberforce Island is geographically located with latitudes "4°51" North and 5°23" south and longitudes 5°22" west and 6°45" east. Wilberforce Island is situated within the rainforest



zone, with a humid equatorial climate with mean annual rainfall ranging from 2000mm to 4000mm, an average maximum temperatures of 30°C and relative humidity between 55 to 90percent.

#### Experimental Birds

A total of one hundred and twenty (120) day old chicks (Cuphon chicks) were bought from De-right Hatchery in Ibadan Oyo state of Nigeria. On arrival, the chicks were counted, de-boxed, weighed and administered Intra Ocula (I.O) vaccine and anti-stress (vitalyte). The chicks were brooded and acclimatized for three (3) weeks, during which they were fed with commercial chick starter feed (top feed) and cool clean drinking water.

#### Experimental Design

At arrival of the birds, they were housed in the brooding house that had been prepared by cleaning, washing and disinfecting. Brooders were set up in good working condition. The floor was well littered with wood shavings and the walls covered with dark water-proof materials. At the completion of the brooding period, the birds were divided into four (4) major groups tagged  $T_1$ ,  $T_2$ ,  $T_3$  and  $T_4$  of thirty (30) birds each. Each treatment ( $T$ ) group was further subdivided into 3 replicates, tagged  $R_1$ ,  $R_2$  and  $R_3$  of ten (10) birds per replicate, in a completely randomized design (CRD). Treatment 1 ( $T_1$ ) was the control and the birds in the  $T_1$  were administered clean drinking water without neem extract (0% neem extract). Treatments 2, 3 and 4 ( $T_2$ ,  $T_3$  and  $T_4$ ) were administered neem extracts (NE) at different concentrations of 3g, 4g and 5g per liter of water respectively.

#### Collection of Neem Leaves and Preparation of Fresh Neem Extract

Mature disease free neem leaves were collected from Aven Community in Patani Local Government Area of Delta State, Nigeria. 3g for  $T_2$ , 4g for  $T_3$  and 5g for  $T_4$  of neem leaves were weighed, washed blended with one (1) litre of water and with a sieve the leaf particles were removed for each treatment. For every quantity of drinking water measured, one (1) litre of neem extract was added and administered to the birds for eight (8) consecutive weeks. The, neem extracts was prepared on daily basis.

#### Data Collection and Recording

At the end of the experimental period, three (3) birds per treatment were randomly selected and bled by severing the jugular vein. The blood samples were collected in labeled lithium heparin bottle and were taken to the laboratory for blood profile evaluation. The vital organs (Gizzards, lungs, liver, spleen, kidney; proventriculus, crop

and heart) of the slaughtered birds were weighed using electronic weighing machine and records were taken for organ weight determination.

#### Data Analysis

The data were analyzed statistically between the control and the treatment groups of chickens, between replicates of treatment and between treatment by variance (ANOVA) and means were compared employing Duncan's Multiple Range Test (Duncan, 1955).

#### Results

Average relative weights of vital body organ result (Table 1) shows that there was no significant difference between the control and experimental treatments, except for lungs weighing and liver weight. Serum enzymes (Table 2) had no significant difference across all parameters measured for control and treatments.

#### Discussion

The standard of the blood of an animal and its purity can determine to a greater extend the health status and performance or functionality of the vital body organs of the animal or bird. The alteration of these serum enzymes potentially affects the functionality of the vital body organs negatively or positively. Khan and Zafer (2005) noted that blood profiles are important indices of physiological state of animals as blood constituents provide valuable media for clinical investigations and nutritional evaluation of an animal. WHO (1963) also recommended the use of blood parameters for medicinal assessment. The present study aimed at evaluating the effects of Neem leaf extracts on blood biochemistry and organ weight of broilers showed no adverse effect in blood and invariably no negative effect on organs and functionality of the experimental birds. However, the decline of TC across treatments, contrast the result of Uko and Kamalu (2008), who used neem seed kernel, added into standard basal diets as a substitute for groundnut cake, but the general result supports Biu *et al.* (2009) who used aqueous extract of neem through intraperitoneal injection with graded doses as 500, 1000 and 2000 mg/kg body weight to chickens.

#### Conclusion and Recommendation

The present study revealed that neem leaf extract has no detrimental effect on blood biochemistry and organs of growing broiler birds. It also left no residual that are harmful. This has laid the foundation for further studies that will look into the possibility of replacing synthetic antibiotics with neem leaf extract. We therefore conclude and recommend neem leaf extract as aqueous



supplement has the potential of serving as a natural organic supplement to replace synthetic antibiotics in raising broiler bird.

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**Table 1.** Average relative weight of vital body organs of broiler chickens administered *Azadirachta indica* extract expressed as percentage live weight

Parameters	T <sub>1</sub> (control) Mean±SE	T <sub>2</sub> (3g NE) Mean±SE	T <sub>3</sub> (4g NE) Mean±SE	T <sub>4</sub> (5g NE) Mean±SE
Gizzard weight (%)	1.29 ± 1.01	1.21 ± 1.15	0.01 ± 1.24	1.92 ± 1.23
Lungs weight (%)	0.62 ± 0.13 <sup>a</sup>	0.33 ± 0.21 <sup>b</sup>	0.35 ± 0.31 <sup>b</sup>	0.40 ± 0.13 <sup>b</sup>
Liver weight (%)	3.01 ± 0.73 <sup>a</sup>	1.20 ± 1.26 <sup>b</sup>	1.76 ± 1.22 <sup>b</sup>	2.06 ± 0.43 <sup>b</sup>
Spleen weight (%)	0.11 ± 0.67	0.08 ± 0.10	0.09 ± 0.31	0.09 ± 0.34
Crop weight (%)	1.09 ± 1.03	0.67 ± 0.21	0.67 ± 0.24	0.64 ± 0.25
Heart weight (%)	0.60 ± 0.13	9.67 ± 0.22	0.41 ± 0.14	0.40 ± 0.12
Kidney weight (%)	0.79 ± 0.22	0.36 ± 1.22	0.76 ± 0.32	0.69 ± 0.45
Proventriculus weight (%)	0.48 ± 0.32	3.97 ± 0.25	0.35 ± 0.11	0.42 ± 0.38

Values within the same row having different superscripts are significantly different from each other (P< 0.05)

**Table 2.** Serum enzymes and serum Biochemistry of control boiler chickens administered Neem Extract.

Parameters	T <sub>1</sub> (control) Mean±SE	T <sub>2</sub> (3g NE) Mean±SE	T <sub>3</sub> (4g NE) Mean±SE	T <sub>4</sub> (5g NE) Mean±SE
T.C (mm/l)	3.17 ± 0.24	6.03 ± 0.15	4.17 ± 0.12	4.63 ± 0.15
T.G (mm/l)	1.30 ± 0.58	0.47 ± 0.18	0.70 ± 0.10	0.83 ± 0.12
HDL (mm/l)	1.60 ± 0.12	2.77 ± 0.15	2.40 ± 0.12	1.60 ± 0.12
AST (U/l)	138.67 ± 3.71	154.67 ± 3.71	71.67 ± 6.44	123.00 ± 4.04
ALT (U/l)	8.00 ± 0.67	8.00 ± 0.67	4.00 ± 0.67 <sup>b</sup>	4.67 ± 0.76
ALP (U/l)	249.00 ± 69.55	335.00 ± 4.52	314.33 ± 1.45	337.67 ± 1.86
T.P (g/l)	59.67 ± 6.44	57.67 ± 3.38	62.33 ± 5.70	54.67 ± 6.36
ALB (g/l)	20.00 ± 1.53	31.67 ± 2.40	22.00 ± 1.53	19.67 ± 4.37
T.C (mm/l)	3.70 ± 0.25	5.60 ± 0.25	3.70 ± 0.25	3.17 ± 0.25
C.B (mm/l)	2.40 ± 0.18	3.67 ± 0.09	2.20 ± 0.12	2.40 ± 0.18

Values within the same row having different superscripts are significantly different from each other (P< 0.05)

Key:

T.C (Total Cholesterol)

T.G (Triglyceride)

HDL (High Density Lipoprotein)

AST (Aspartate Aminotransferase)

ALT (Alanine Transaminase)

ALP (Alkaline Phosphate)

T.P (Total protein)

ALB (Albumin)

C.B (Conjugated Bilirubin)

NE (Neem Extract).