



## Evaluation of Neem Leaf Extract (*Azadirachta indica*) on Growth Performance and Biochemical Profile of Broiler Finisher Chickens.

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### ABSTRACT

A four weeks feeding trail was conducted to evaluate the effect of varying levels of neem (*Azadirachata indica*) leaves extract on growth performance of broiler finisher chickens, 120 broiler finisher chicken were randomly weight and divided into four groups (treatment) designated as T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, and T<sub>4</sub> of thirty (30) bird. Each replicated 3 times, in a completely randomized design and were administered clean drinking water with 0g, 3g, 4g and 5g neem extract respectively. All were given same basal diets of broiler finisher. The result shows that inclusion of varying neem extract did not affect feed consumption and water intake of the birds in all the treatment group. Also the result of the carcass and biochemical profile were not significant (*p*70.05) affected by the basal diets and neem leaf extract. This indicates that the use of neem leaf extract as supplement for antibiotic in broiler production is both safe and healthy.

**Keywords:** Medical value of neem leaf, Neem Leaf in animal production, plant origin, local extraction, natural and safe.

### INTRODUCTION

The production of healthy birds with quality meat and eggs without harmful residues within a short interval is the major concern to modern poultry farmers. The use of synthetic drugs as antibiotics and growth promoters has high cost implications, and sometimes, with attending adverse side effect on birds health, prolonged withdrawal period and risk of accumulation in tissues and eggs which could have harmful effect on human health (Javad et al, 2014). As a result, consumers of poultry products are demanding for drugs residues free meat and egg. This has triggered the search for alternative means to produce birds at reduced cost using natural health promoters. Neem (*Azadirachta india*) popularly known in Nigeria as Dogon Yaro is a fast growing indigenous tree that thrives well in all part of Nigeria even in poor shallow, stony or sandy soil where agriculture crops give low yield (Ogbuewu et al. 2011). Neem tree is a widely research tree that has attracted world-wide recognition due to its vast range of medicinal potentials like antibacterial, antiviral, antifungal, antiprotozoal, hepatoprotective (Keta et al, 2017) and anti-cilcidial effect in broilers and used as pesticide (Esonu et al, 2006; Akpan et al. 2008) various other properties have been documented in respect of its many bioactive components (Akpan at al. 2008), that may also influence hematological and serum biochemical parameters.

### MATERIALS AND METHODS

#### Study Area

The experiment was conducted at the teaching and research farm of College of Agriculture Jalingo Taraba state which is located between latitude 8° – 30° north and longitude 11° 50'' east in guinea savannah zone of northern Nigeria, the area receive an annual rainfall of 1500mm spread between May-November. The mean minimum and maximum temperature range from 32°C – 38°C depending on the season. It has undulating topography with complex



group of mountains and hills, the soil type ranges from sandy to loam which make the inhabitants mostly farmers.

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

Mature disease free leaves were collected from Taraba state college of Agriculture in Ardo-Kola local government Taraba state. 3g for  $T_1$ , 4g for  $T_2$  and 5g for  $T_3$  of neem leaves were weighed, wash blended with one (1) liter 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 four (4) consecutive weeks. The neem extracts was prepared on dialy basis.

### **Experimental Animals**

A total of one hundred and twenty (120) broiler chicken were purchased from a commercial poultry farm in Jalingo Taraba state. On arrival, the birds were counted, weighed and were given anti-stress (vitalyk). The chickens were acclimatized for one week during which they were fed with commercial starter diet and clean drinking water.

### **Experimental Design**

After one week acclimatization 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 randomize design (CRD). Treatment 1 ( $T_1$ ) was the control and the birds in the  $T_1$  were administered clean drinking water without neemextract (0% neem extract) at different concentration of 3g, 4g, and 5g per litre of water respectively. All were fed the basal formulation broiler finisher diets.

### **Evaluation of Carcass.**

At the end of 28 days feeding trials, 2 birds per replicate each were randomly selected. Live weight was taken before carcass evaluation after fasting them overnight, the birds were slaughter by severing their jugular vein with sharp knife, the birds were then emerge in hot water, de-feathered and washed. The internal contents were heartily removed and weighed (evisceration) followed by the cutting of the carcass into retail parts and weighed, dressing weight was recorded after evisceration. The weight was expressed as dressed weight.

### **Data Collection**

After one week of acclimatization period, initial weight of the bird were taken, then they were randomly weight and assigned to the treatment groups, final five weight, daily weight gain were taken and feed conversion ratio was computed, while mortality was recorded was absent.

### **Data Analysis**

The data were analyzed statistically between the control experiment and the treatment groups of chickens, between replicates, of treatment and between treatment by variance (Anova) and means were separated using Duncan's multiple range test (Duncan, 1955).



## RESULTS AND DISCUSSION

**Table 1: Chemical Composition of Basal Diet and Neem Leaf**

Nutrient	Basal Diet	Neem Leaf
Drymatta	87.82	91
Crude protein (cp)	19.90	20.68
Crude fiber (cf)	2.26	16.60
Ether extract (ee)	3.50	4.12
Ash	4.02	7.08
Nitrogen free extract (nfe)	70.32	51.52

The crude protein contents of basal diet and neem leaf is 19.90 and 20.68] is adequate for broiler finisher Saskatchewan (2000) recommended 20% protein levels of broiler reared in the tropical area. The quantity and quality of protein are critical factor to be considered in poultry industry. This is because voluntary feed intake (vfi) has been found to increase with improvement of protein quality. (Saskatchewan 2000) from the above table there, it is apparent that the diet and the nutrient in the neem leaf will met the requirement for CP, CF, and EE of broiler finisher in this experiment.

**Table 2: Performance Characteristics of Broiler Finisher Chickens Fed Basal Diet and Neem Leaf Extract.**

Parameter	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	SEM
Initial wt(g)	96.43	107.33	97.67	102.00	2.57
Final wt(g)	2140.90 <sup>a</sup>	2161.10	1765.60 <sup>b</sup>	1644.40 <sup>b</sup>	73.3
Total wtgain(g)	2044.50 <sup>a</sup>	2053.80 <sup>b</sup>	1667.90 <sup>b</sup>	1539.40 <sup>b</sup>	72.70
Average daily at gain (g)	36.51 <sup>a</sup>	36.67 <sup>a</sup>	21.79 <sup>b</sup>	27.55 <sup>b</sup>	1.29
Total feed intake(g)	5174.10	5388.50	5051.30	4792.60	86.20
Average daily feed intake(g)	92.39	94.44	90.74	85.58	1054
F.C.R	2.54 <sup>b</sup>	2.58 <sup>b</sup>	3.04 <sup>a</sup>	3.12 <sup>a</sup>	0.09
N.L.E intake		41.8	43.7	41.0	2.70
Mortality	-	-	-	-	-

SEM = standard error of mean.

AB = mean on the same row with different super script were significantly ( $p > 0.05$ ).

N.L.E = Neem leaf extract

WT = weight

### Initial Weight

The initial weight of experimental birds shared no significant ( $p > 0.05$ ) group difference among the treatment group range (94.43-107.33g) per weight of the termination of the experiment. Which is slightly higher than body weight broiler recommended by Obun and Ayanwale, 2008.



### Daily Weight Gain (G)

The result of daily weight showed some level of significant ( $p > 0.05$ ) difference for mean daily gain. Bird, feed on T<sub>2</sub> and T<sub>1</sub> gain higher weight gain of 36.67 for T<sub>2</sub> and 36.51 for T<sub>1</sub>. Compared to T<sub>3</sub> and T<sub>4</sub>, 29.79 and 27.55 respectively. This result shows that the inclusion of different level of neem extract did not affect feed consumption and water intake of the birds.

### Final Weight

The average mean value of final weight of the bird obtained for this study were ranged between 1644.40/bird – 2161.10/bird (1.64 – 2.16kg). The result of final weight showed some levels of significance ( $p > 0.05$ ) difference for T<sub>2</sub> and T<sub>1</sub> 2161 and 2149.90 and 1765.60 and 1644.40 for T<sub>3</sub> and T<sub>4</sub> respectively. Feed utilization was depressed in treatment 3 and 4. This is evident from the result of average weight gain which shows a value of 2044.50, 2033.80, 1667.90 and 1539.40 and 46.9, 47.8, 43.7 and 41.0 for treatment 1, 2, 3 and 4 respectively.

### Average Daily Feed Intake

The result obtained for average daily feed intake indicates that, there was no significant ( $p > 0.05$ ) difference in the mean feed intake value among treatment. The neem value for T<sub>2</sub> was slight higher (94.44) compare to T<sub>1</sub>, T<sub>3</sub> and T<sub>4</sub> (92.39, 90.74, and 85.58) respectively. All the value were lower than 115.12g of daily FI reported by (Oluyemi and Robert, 1985) this variation may be due to the neem leaf extract which the bird uses as water, and the environment where the bird were raised.

### Feed Conversion Ratio

The feed conversion ratio (pilios) significantly for T<sub>1</sub> and T<sub>2</sub> were significantly lower than T<sub>3</sub> and T<sub>4</sub> which indicates that the feed was better utilized in T<sub>1</sub> and T<sub>2</sub>, T<sub>1</sub> with 0g of neem extract while T<sub>2</sub> with 3g lower neem extract than T<sub>3</sub> and T<sub>4</sub>. The better utilization could be as a result of 0g neem extract in treatment 1 (T<sub>1</sub>) which enhance more water intake for better feed utilization and proper digestibility.

### Mortality

No motility was recorded during the period of the experiment, which is an indicator that neem extract has some medicinal tendency and safe for poultry production more especially in areas birds are raised with minimal access to veterinary services.

**Table 3: Carcass Characteristics of Broiler Finisher Fed Basal Diet and Neem Leaf Extract**

Parameter	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	SEM	LS
Live weight (kg)	1.70	1.78	1.80	1.86	6.68	N <sup>s</sup>
Slaughter wt (kg)	1.65	1.76	1.68	1.74	0.62	N <sup>s</sup>
Dressed wt (kg)	1.61	1.73	1.79	1.80	0.09	N <sup>s</sup>
Head (g)	46.01	58.03	54.06	48.38	4.001	N <sup>s</sup>
Neck (g)	112.00	118.00	124.00	123.00	4.30	N <sup>s</sup>
Chest (g)	303.65	310.00	314.00	308.00	22.81	N <sup>s</sup>
Back (g)	126.01	134.00	136.02	129.03	6.11	N <sup>s</sup>



Drumstick (g)	201.00	213.50	210.20	190.10	21.11	NS
Thigh (g)	212.50	234.01	235.04	221.00	21.01	NS
Shank (g)	70.77	83.52	79.58	68.49	8.50	NS
Wing (g)	181.00	214.00	198.00	173.01	6.70	NS

SEM = Standard Error Mean

LS = Level of Significance

NS = Not Significance ( $P > 0.05$ ).

The result showed that all the carcass traits evaluated (slaughter weigh, dressed weigh, the head, neck, chest, back, drumstick; thigh, shank and wing were not significantly ( $P > 0.05$ ) affected by the basal diet and neem leaf extract. This implied that the inclusion of neem extract in drinking water of broiler birds has the potential of stimulating. The yield of carcass extremely no mortality observed in all the group in which neem extract was administered. Suggests that neem extract acted positively as an antibiotic at all level; supporting previous reports that the active ingredients in neem (e.g nimbin, nimbidine, Azadirachta etc) inhibit activities of a host of pathogens (Emenalom and Cidedibie 1998; Awosanya et al, 1999; Amadicha 2000) and can thus be used as antibiotics and broiler production.

**Table 4: Serum Biochemical Indices in Broiler, Finisher Fed *Azadirachta Indica* Leaves Extract.**

Parameter	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	SEM	LS
Albumin (g/dl)	3.44	3.01	3.40	3.14	2.23	0.20/NS
Total Protein (g/dl)	6.07	5.87	6.55	6.14	6.04	0.08/NS
Cholestoral	39.31	38.00	41.14	37.00	39.12	1.50/NS
Globulin (mg/dl)	2.64	2.86	2.28	2.33	2.57	0.30/NS
Glocose (mg/dl)	78.00	75.78	81.92	82.81	79.60	4.15/NS
Calcium (mg/dl)	1.08	1.09	1.07	1.05	1.07	0.88/NS
Phosphorous (mg/dl)	0.32	0.34	0.39	0.34	0.34	0.28/NS

NS = No Significance ( $P > 0.05$ )

SEM = Standard Error of Means

### Serum Biochemistry

The serum biochemical indices are presented in table 4. The total protein, albumin, the globulin were not significantly different ( $p > 0.05$ ) among the treatment groups. The value recorded for these parameters were within the acceptable ranges of 5.0-8.0g/dl 2.5-4.0g/dl and 2.15-2.85g/dl for total protein albumin and globulin respectively as reported by Anon (1980). The values obtained for total protein, albumin and globulin are generally influenced by total protein intake. (Birth and Sehuldt, 1982; Onifade and Tewe 1993). The non-significant difference observed in all parameters measured in serum biochemistry assays, observed values are intended with normal ranges reported for healthy birds. Trinca et al., 2013). This implies that the use of neem extract as supplement for antibiotic in broiler production is both safe and healthy.



## CONCLUSION

This study has shown that neem extract inclusion in water for broiler finisher chickens has no differential effect on the birds, which implies that the consumable product will pose no health hazard to consumers.

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