

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 T1, T2, T3, and T4 of thirty (30) bird. Each replicated 3 times, in a completely randomized design and was 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 the entire treatment group. Also the result of the carcass and biochemical profile were not significant ($p > 0.05$) 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 indica*) 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 et 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 T₂, 4g for T₃, and 5g for T₄ 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 group tagged T₁, T₂, T₃ and T₄ of thirty

(30) birds each. Each treatment (T) group was further subdivided into 3 replicates tagged R₁, R₂, and R₃ of ten (10) birds per replicate, in a completely randomized design (CRD). Treatment 1 (t₁) was the control and the birds in the T₁ were administered clean drinking water without neem extract (0% neem extract) at different concentrations 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 slaughtered by severing their jugular vein with a sharp knife, the birds were then immersed in hot water, de-feathered and washed. The internal contents were carefully 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 birds were taken, then they were randomly weighed and assigned to the treatment groups, final live weight, daily weight gain were taken and feed conversion ratio was computed, while mortality was recorded as 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
Dry matter	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	T1	T2	T3	T4	SEM
Initial wt(g)	96.43	107.33	97.67	102.00	2.57
Final wt(g)	2140.90 ^a	2161.10	1765.60 ^b	1644.40 ^b	73.3
Total wt gain(g)	2044.50 ^a	2053.80 ^b	1667.90 ^b	1539.40 ^b	72.70
Average daily wt gain (g)	36.51 ^a	36.67 ^a	21.79 ^b	27.55 ^b	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 ^b	2.58 ^b	3.04 ^a	3.12 ^a	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 T2 and T1 gain higher weight gain of 36.67 for T2 and 36.51 for T1.

Compared to T3 and T4, 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 T2 and T1 2161 and 2149.90 and 1765.60 and 1644.40 for T3 and T4 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 T2 was slight higher (94.44) compare to T1, T3 and T4 (92.39, 90.74, and 85.58) respectively. All the value were lower than 115.12g of daily F1 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 (pilos) significantly for T1 and T2 were significantly lower than T3 and T4 which indicates that

the feed was better utilized in T1 and T2, T1 with 0g of neem extract while T2 with 3g lower neem extract than T3 and T4. The better utilization could be as a result of 0g neem extract in treatment 1 (T1) which enhance more water intake for better feed utilization and proper digestibility.

Mortality

No mortality 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 ₁	T ₂	T ₃	T ₄	SEM	LS
Live weight (kg)	1.70	1.78	1.80	1.86	6.68	N ^s
Slaughter wt (kg)	1.65	1.76	1.68	1.74	0.62	N ^s
Dressed wt (kg)	1.61	1.73	1.79	1.80	0.09	N ^s
Head (g)	46.01	58.03	54.06	48.38	4.001	N ^s
Neck (g)	112.00	118.00	124.00	123.00	4.30	N ^s
Chest (g)	303.65	310.00	314.00	308.00	22.81	N ^s
Back (g)	126.01	134.00	136.02	129.03	6.11	N ^s
Drumstick (g)	201.00	213.50	210.20	190.10	21.11	N ^s
Thigh (g)	212.50	234.01	235.04	221.00	21.01	N ^s
Shank (g)	70.77	83.52	79.58	68.49	8.50	N ^s
Wing (g)	181.00	214.00	198.00	173.01	6.70	N ^s

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

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 Schuldt, 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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