

Utilization of *Justicia carnea* aqueous leaf extract for growth and carcass yield by finisher broiler chickens

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**Abstract**

The study was conducted to investigate the effects of different levels ( 0 ml, 10 mls, 15 mls and 20 mls ) of *Justicia carnea* aqueous leaf extract on growth and carcass yield of ninety-six (96) 4-weeks old broiler chickens. The experiment was arranged in a Completely Randomized Design pattern using four (4) treatments. The chickens were weighed at the end of the fourth week and randomly allotted to the four treatments levels that were replicated twice to accommodate 12 chickens per replicate. The initial body weight of 842.70 g, 849.70 g, 834.90 and 833.90 g were recorded for treatment 1 (T1), treatment 2 (T2), treatment 3 (T3) and treatment 4 (T4) that received 0ml, 10 mls, 15 mls and 20 mls of the *Justicia carnea* aqueous leaf extract respectively. Fresh green *Justicia carnea* leaves were harvested, washed, air - dried under shade and blended to produce a leaf- paste. One part of the leaf- paste was mixed with 2 parts of hot (100°C) water and allowed to stay for six hours to ensure that quite a good quantity of the leaf ingredients were extracted. The mixture was then filtered with Watchman's No1 filter paper to obtain the filtrate ( the aqueous leaf extract) that were stored in closed containers and preserved in refrigerator at 2°C for further use in this experiment. The test extract was then administered thrice weekly from the beginning of week 5 to end of week 8 of the experiment. Feed and water were provided ad libitum all through the period of this experiment. Records of feed intake and body weight changes were taken on daily and weekly basis respectively for the computation of the performance ability of the chickens; while carcass analysis was done at the end of the experiment using two birds carefully selected from each replicate, weighed, slaughtered and the carcass attributes measured. Data collected were subjected to statistical analysis using Analysis of Variance (ANOVA) of Genstat Statistical Package (12th edition); and significant means were separated using Duncan's Multiple Range Test (DMRT) of the same package. Results revealed significant (  $p < 0.05$  ) differences in the mean values of final body weight/ live weight, dressing percentage, weights of neck, gizzard, and spleen of the broiler chickens; while the rest of the carcass attributes ( carcass weights, weights of carcass cut parts and organs weights ) under investigation did not show significant (  $p > 0.05$  ) differences in their treatment means. However, birds in the 10 mls level group of the extract consumed less quantity of feed (170.60 g) but yielded higher daily weight gain (55.72 g) resulting in significant (  $p < 0.05$  ) final body weight (4630 g) over its counterparts, as well as those in the control group. Hence, it could be concluded that *Justicia carnea* aqueous leaf extract should be incorporated into broiler chickens' production at a recommended level of 10 mls daily dose regimen.

**Key words:** *Justicia carnea*, Aqueous leaf extract, Growths, Carcass yield, Finisher broiler,

**Introduction**

Poultry raising has undergone a noticeable shift in structure and activity, transforming itself from an ordinary backyard sector into a major commercial enterprise so as to meet the growing demand for animals' protein for the teeming populace (Dalal and Kosti, 2018). To be able to satisfy the increasing human population with poultry meat and its products, synthetic antibiotics growth promoters (AGPs) are incorporated into animal's feed to stimulate growth, rapidly increase productivity, reduce production cost, feed efficiency, infections and mortality (Etela et al., 2011).

According to Achilonu et al., (2018), the continuous use of these growth promoters (AGPs) attracts detrimental reproductive effects on the final products as a result of the accumulation of chemical residues in the bodies of these birds which is apparently passed on to the final consumers. Also, the controversy surrounding the use of artificial supplements in animal agriculture has drawn attention to natural antioxidants from plants extracts which has been found to influence the endogenous antioxidant system, performance and products quality (Lee et al., 2017).

Achilonu et al., (2018) opined that this situation has been the prime stimulant for the vigorous search for cheap and locally available substitutes that can compete favourably with these chemical growth promoters. Hence, the use of plant material such *Justicia carnea* as an alternative for AGPs in poultry production has recently been considered. Researchers have reported *Justicia carnea* as an ethno veterinary medicinal plant widely used all over the world for a more effective blood- boosting properties better than blood tonic [Imohiosen, (2022); Peter et al., (2022); Ajuru et al., (2021)]. Here in Nigeria, the plant is known as "Blood of Jesus", "Blood leaf", "Hospital too far", etc. Traditionally, several species of *Justicia carnea* are used in the management of inflammation, gastrointestinal disorders, respiratory tracts infection, diarrhea, liver diseases, etc (Peter et al., 2022)

Carcass composition refers to the relative proportion of dissected skeletal muscle, adipose tissues, and bone measured in growth experiment. Carcass measurements of breast and drumstick as well as carcass weights are frequently used to classify carcasses for pricing and marketing activities and to estimate total carcass mass of chickens. Although, consumers value broiler chicken meat in terms of product quality - tenderness, fat content, texture, appearance, etc -, broiler producers' revenue is

directly related to carcass characteristics such as carcass weight and fat distribution. As reported by da Silva *et al* (2017), profitability of broiler chicken's production is highly influenced by weight gain and feed conversion ratio. Hence, carcass characteristics are essential for a successful whole broiler chicken meat production chain and meat quantity.

This study was therefore conducted to assess the utilization of *Justicia carnea* aqueous leaf extract on the total growth performance and carcass characteristics of broiler chickens.

### Methodology

The experiment was carried out at the Poultry unit of the Teaching Research Farm of the University of Benin, Benin City, Edo State, Nigeria.

One hundred (100) day old broiler chicks were purchased and raised to finisher stage (first four weeks) after which the actual experiment commenced and lasted for another four weeks. At the beginning of the fifth week period, ninety- six of the broiler chickens were weighed and randomly allotted into four treatments of twenty- four (24) chickens each. Each group was assigned to one of the levels of T1, T2, T3 and T4 receiving 0ml, 10 ml, 15ml and 20ml of the test extract respectively in a completely randomized design arrangement. Each treatment group was further subdivided into two (2) replicates of twelve (12) chickens each. Feed and water were supplied to the them at ad libitum.

Fresh green *Justicia carnea* leaves were harvested, washed, blended, filtered and the filtrate preserved in a refrigerator at 2°C for this experiment. Before filtering, one (1) part of the leaf- paste was mixed with two (2) parts hot water (100°C) giving a ratio of 1:2 mixture. The mixture was allowed to stay for six hours to ensure that quite a good quantity of the leaf ingredients have been extracted and thereafter filtered it with Watchman's No1 filter paper. This was repeated weekly to ensure the freshness of the plant extract administered to the chickens.

Records of feed intake and body weights were taken daily and weekly respectively for the computation of the performance ability of the chickens; whereas carcass evaluation was carried out at the end of the experiment with the selection, weighing, slaughtering and further processing of two (2) chickens from each replicate. The carcass attributes were then measured.

Data collected were subjected to statistical analysis using Analysis of Variance (ANOVA) of Genstat Statistical Package (12th edition); and significant means were separated using Duncan's Multiple Range Test (DMRT) of the same package.

### Result and Discussion

Performance of the finisher broiler chickens served varied levels of *Justicia carnea* aqueous leaf extract is contained in Table 1 and revealed significant ( $p < 0.05$ ) differences between the treatment values of final body weight, dressing percentage, weights of neck and shanks as well as those of organs ( gizzard and spleen). These parameters

were found to reduce significantly ( $p < 0.05$ ) with the increasing levels of the test extract. Interestingly, broiler chickens receiving 10 mls of the plant extract were highly favored in their final body weight (4630 g) over its counterparts when compared to chickens in the control group. This could be attributed to the mineral (particularly phosphorus) inhibiting activities of the test extract beyond 10 mls level after which, subnormal growth and low live weight gain occurs. This phosphorus unavailability initiate bowel emptying in the broiler chickens, thereby invoking more feed intake in them. This study was supported by Nworgu *et al.*, (2013), and Nworgu *et al.*, (2011) who reported phosphorus deficiency as the root cause of high feed intake. On the other hand, all other parameters (initial body weight, daily feed intake, daily weight gain, and feed conversion ratio) for growth attributes measured in this experiment were statistically similar to those of the control group.

Gizzard and spleen showed significant ( $p < 0.05$ ) differences in the carcass measurement of the broiler chickens on the test extract groups. This implies that the *Justicia carnea* aqueous leaf extract influenced the weights deposited by these parameters. Hence, the lowest (0.68%) and highest (1.53%) weights of the gizzards deposited by broiler chickens in treatments 2 and 4 could probably be due to less grinding activity in the former and more grinding activity in the later resulting from their feed intake levels. This report was supported by Udofia *et al.*, (2024) and Etela *et al.*, (2011) that higher level of herbal extracts enhances feed intake and increases the gizzard weight of the broiler chickens. On the contrary, the absolute weights of the liver, lungs, heart and kidneys were not significantly ( $p > 0.05$ ) impacted at the levels of the extract adopted in this present experiment. This implies that even at 20 mls level of the extract, no detrimental effect was noted on the internal organs' development of the broiler chickens. The non- significant ( $p > 0.05$ ) differences among carcass values might be due to the adequacy of protein and the energy level of the extract resulting in the production of similar muscle growth and development. This result was in line with Udofia *et al.*, (2024) who reported similar results on animals treated with *Costus afer* pure stem juice extract.

### Conclusion and Recommendation

In conclusion, *Justicia carnea* aqueous leaf extract can be administered as an alternative to antibiotic growth promoters (AGPs) in broiler chickens' finisher production up to 20 mls without any deleterious effects on their performance and carcass yield; but at a recommended 10 mls level which produced the best results obtained from this present study.

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**Table 1. Growth Performance of Finisher Broiler Administered *Justicia carnea* Aqueous Leaf Extract**

PARAMETERS	T1	T2	T3	T4	SEM
Initial Body Weight (g)	842.7	849.7	834.9	833.9	15.503
Feed Intake (g)	188.2	170.6	1175.2	187.7	32.918
Daily Weight Gain (g)	99.49	55.72	47.32	46.11	23.47
Feed Conversion Ratio (%)	1.975	1.62	1.735	1.73	0.117
Final Body Weight (g)	3.628 <sup>b</sup>	4630 <sup>a</sup>	3700 <sup>b</sup>	3665 <sup>b</sup>	118.1

**Key:** T1 is the control, T2 (10 ml *Justicia carnae* aqueous leaf extract). T3 (15ml *Justicia carnae* aqueous leaf extract), T4 (20 ml *Justicia carnae* aqueous leaf extract).

<sup>a-b</sup>Means bearing superscripts on the same row are significantly different (p<0.05); while means without superscript on the same row are not significantly different (p>0.05).

**Table 2. Hot Carcass Weights of Finisher Broiler Administered *Justicia carnea* Aqueous Leaf Extract**

PARAMETERS	T1	T2	T3	T4	SEM
Live Weights (g)	3628 <sup>b</sup>	4630 <sup>a</sup>	3700 <sup>b</sup>	3665 <sup>b</sup>	118.10
Slaughter Weights (g)	3390	3722	3472	3456	78.90
Eviscerated Weights	3016	3258	3043	3040	82.70
Dressed Weights (g)	2716	3004	2772	2728	101.10
Dressing Percentage (%)	136.7 <sup>b</sup>	154.2 <sup>a</sup>	132.3 <sup>b</sup>	132.6 <sup>b</sup>	2.91

**Key:** T1 is the control, T2 (10ml *Justicia carnae* aqueous leaf extract). T3 (15ml *Justicia carnae* aqueous leaf extract), T4 (20ml *Justicia carnae* aqueous leaf extract).

<sup>a-b</sup>Means bearing superscripts on the same row are significantly different (p<0.05); while means without superscript on the same row are not significantly different (p>0.05).

**Table 3. Weight of Cut Parts of Finisher Broiler Administered *Justicia carnea* Aqueous Leaf Extract**

PARAMETERS	T1	T2	T3	T4	SEM
Breast Weights (g)	1106	1184	1150	1098	48.60
Thigh and Drumstick (g)	394.5	454.5	411.5	409.10	13.33
Wing Weights (g)	127.5	160.0	146.5	149.5	11.61
Neck Weights (g)	138.5 <sup>ab</sup>	149.5 <sup>b</sup>	136.5 <sup>a</sup>	135.0 <sup>b</sup>	2.56
Shanks (g)	44.50 <sup>c</sup>	58.00 <sup>a</sup>	54.50 <sup>ab</sup>	53.00 <sup>b</sup>	1.55

**Key:** T1 is the control, T2 (10ml *Justicia carnea* aqueous leaf extract). T3 (15ml *Justicia carnea* aqueous leaf extract), T4 (20ml *Justicia carnea* aqueous leaf extract).

<sup>a,b,c</sup>Means bearing superscripts on the same row are significantly different ( $p < 0.05$ ); while means without superscript on the same row are not significantly different ( $p > 0.05$ ).

**Table 4. Organs' Weights of Finisher Broiler Administered *Justicia carnea* Aqueous Leaf Extract**

PARAMETERS	T1	T2	T3	T4	SEM
Eviscerated Weight (g)	3016	3258	3043	3040	82.70
Gizzard Weight (%)	1.88 <sup>a</sup>	0.68 <sup>c</sup>	1.27 <sup>ab</sup>	1.53 <sup>b</sup>	0.10
Heart Weight (%)	0.49	0.91	0.48	0.47	0.26
Kidney Weight (%)	0.08	0.09	0.11	0.10	0.02
Liver Weight (%)	2.19	2.42	2.66	2.35	0.25
Lungs Weight (%)	0.39	0.28	0.44	0.44	0.12
Spleen Weight (%)	0.67 <sup>a</sup>	0.22 <sup>b</sup>	0.11 <sup>c</sup>	0.09 <sup>c</sup>	0.01

**Key:** T1 is the control, T2 (10ml *Justicia carnea* aqueous leaf extract). T3 (15ml *Justicia carnea* aqueous leaf extract), T4 (20ml *Justicia carnea* aqueous leaf extract).

<sup>a,b,c</sup>Means bearing superscripts on the same row are significantly different ( $p < 0.05$ ); while means without superscript on the same row are not significantly different ( $p > 0.05$ ).