CARCASS CHARACTERISTICS OF BROILER CHICKENS FED GRADED LEVELS OF PROCESSED BITTER LEAF (*Vernonia amygdalina*) MEAL AS PHYTOGENIC ADDITIVES

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ABSTRACT
The major constraint to the production of broiler chicken in Nigeria is the increasing cost of feed and feed availability. In order to alleviate feed cost and enhance maximum production, various feed additives are used in poultry to maximize net returns and carcass quality. Hence this study tends to assess the phytobiotic potentials of biterleaf. An 8weeks research was carried out to investigate the carcass characteristics of broiler chickens fed graded levels of diets containing dried bitter leaf meal. A total of 72 Ross '308' broiler chicks were randomly assigned to four dietary treatments T_1, T_2, T_3, and T_4 consisting of 0, 250, 350 and 500g of dried bitter leaf meal per 100kg respectively. The experiment was laid out in a completely randomized design with eighteen (18) birds per treatment with three replicates per treatment and six (6) birds per replicate. At the end of the experiment, 1 bird per replicate (n = 12) was selected and slaughtered for carcass evaluation. The primal cut weights were expressed in percentage of respective live weight. Data obtained were subjected to One-way Analysis of Variance (ANOVA) using General Linear Model procedure of software package SAS. The processed bitter leaf meal had significant ($p<0.05$) effects on the live weight, bled, dressed, eviscerated weights, dressed percent and the relative neck weight of broiler chicken at finisher phase. The broilers fed T_4 treatment had the highest ($p<0.05$) live weight (3466.67±0.04), bled weight (3166.67±0.04g), dressed weight (3000.00±0.04g), Eviscerated weight (2666.67±0.04g) comparable with those on control. Dressing percentage was significantly ($p<0.05$) highest among birds placed on 250g of dried bitterleaf meal. Significant differences were observed in the relative weight of neck and empty gizzard with higher value observed among birds fed 350g of dried bitterleaf meal. However, every other parameter measured shows similarities with no significant differences ($p>0.05$) among them. It is therefore concluded that processed bitter leaf meal can successfully be included in broiler chickens diet up to 500g. It is also recommended that further studies be carried out on the blood chemistry of the birds fed the treatment diet.
Keywords: ***Broiler chickens, Bitter leaf, Proximate composition, Carcass characteristics,***

INTRODUCTION

Broiler production is becoming a popular poultry farming all over Nigerian due to high demand for its meat throughout the country (Upah *et al.,* 2021). Broiler meat is mostly loved and has no tribal or religious discrimination in Nigeria. A lot of people, who consume this meat, do so because of its nice taste, tenderness and nutritive value; it is said to be high in protein and low in calorie (Dieye *et al*., 2004). The major constraint to the production of broiler chicken in Nigeria is the increasing cost of feed and feed availability (Dieye *et al.,* 2004). Indeed, feeding alone accounts for 60-80% of the total production cost of broiler enterprise (Okey and Eged, 2021). In order to alleviate feed cost and enhance maximum production, various feed additives are used in poultry to maximize net returns and carcass quality (Khan *et al.,* 2012). Feed additives are ingredients added to poultry diets to enhance production efficiency, improve health and reduce morbidity (FAO, 2008). A major feed additive which has been used for decades in poultry production is the antibiotics. Bans on the use of antibiotics as feed additives have accelerated and led to investigations on natural alternative feed additives in animal production (Polat, Yesilbag and Eren, 2011). Biogenic and plant derived products have proven to be natural, less toxic, residue free and are thought to be ideal feed additives in animal feed production.

These herbal products can be added to feed as dried plants or parts of plants and as extract (Okey and Eged, 2021). One of the herbal leaves which have been used in poultry/broiler nutrition as extract or leaf meals is bitter leaf (Olorunleke and Nte, 2015; Owen and Amakiri, 2012). Bitter leaf (*Vernonia amygdalina*) is a shrub and one of the edible vegetables in Nigeria and other parts of Africa (Igbakin, 2009). It has both medicinal and nutritive values (Ekpo, Eseyin, Ikpeme, and Edoho, 2007). It is popularly called bitter leaf because of its abundant bitter principles (Abiose, 2009). Bitter leaf can be used as an anticoccidial in broiler rations and does not interfere with the health status of poultry (Banjoko, Adebayo, Osho, and Olumide, 2019). Also, inclusion of 0.3% of bitter leaf meal improved carcass quality parameters such as carcass weight, dressing percentage and has no deleterious effect on

the internal organs of the birds and positively influenced the serum metabolites, thereby confirming that bitter leaf meal can reduce the risk factors of high cholesterol level (Daramola, Oloruntola and Ayodele, 2018).This current study therefore focused on evaluating the carcass characteristics of broiler meat fed processed bitter leaf meal.

MATERIALS AND METHODS

Location and duration of the study The research was carried out at the Poultry Unit of the Teaching and Research Farm of Ambrose Alli University, Ekpoma, Edo State with the coordinate 6.7384^{o}N, 6.0811^{O}E for the period of eight weeks.

Experimental feed and bitter leaf (*Vernonia amygdalina*)

The commercial broiler feed was used for this experiment while bitter leaf (*Vernoniaamygdalina*) leaves was processed by airdrying. The fresh leaves of *Vernonia amygdalina* were sourced within and around the University community.

Experimental diets

Four experimental diets were prepared using the commercial broiler feed and the test ingredients as additives. Treatment 1 (T_1) was without the inclusion of bitter leaf meal which serve as control; Treatment 2 (T_2) contained 250g of bitter leaf meal/100kg of feed; Treatment 3 (T_3) contained 350g of bitter leaf meal /100kg of feed while Treatment 4 (T_4) 500g of bitter leaf meal /100kg of feed.

Experimental Birds and Design

A total of 72 "Ross 308" broiler chicks were used for the experiment. The birds were randomly assigned to four dietary treatments (T_1, T_2, T_3, and T_4) with eighteen (18) birds per treatment in a completely randomized design (CRD) with 3 replicates per treatment including 6 per replicate.

Management of experimental birds

The chicks were brooded for two (2) weeks. Adequate temperature, ventilation and humidity were ensured during the brooding period. Routine medication and vaccinations for broiler chicken were strictly followed. Also, all the experimental birds were exposed to the same routine management practices throughout the experimental period. The birds were allowed access to feed and water *ad libitum*. They were fed commercial diet without test ingredient for the first two weeks of acclimatization. Thereafter they were fed broiler starter mash with different levels of test ingredient for 4 weeks starter phase and broiler finisher mash with test ingredient for another 4 weeks of finisher phase.

Carcass Characteristic studies

At the end of the experiment, 1 bird per replicate was selected based on the average live weight of the birds and tagged for proper identification. The birds were starved of feed for 8 hours before they were weighed, slaughtered, defeathered, eviscerated then were weighed again. They were dissected and the external offal was carefully removed. The carcasses were weighed to obtain the dressed weight and portioned into different primal cuts. The primal cut weights were expressed relative to live weight.

Statistical Analysis

The data obtained from the carcass analysis of broiler carcass was subjected to One-way Analysis of Variance (ANOVA) in a Completely Randomized Design using General Linear Model procedure of the software package SAS for windows (SAS, 2015. version 9.1.3). Means of significant results were compared by Duncan Multiple Range Test (DMRT) of the same package.

RESULTS

Table 1. showed the carcass characteristics of finishing broilers fed diets containing graded levels of Processed bitter leaf meal. The results indicated that the dried bitter leaf meal had significant ($p<0.05$) effects on the live weight, bled, dressed, eviscerated weights, dressed percent and the relative neck weight of broiler chicken at finisher phase. Live weight (3466.67±0.04g/bird), Bled weight (3166.67±0.04g/bird), dressed weight (3000.00±0.04g//bird) and eviscerated weight (2666.67±0.05g/bird) were recorded among birds fed 500g of PBLM/100kg feed was significantly ($p<0.05$) highest as comparable with those on the control diet. Although the live, bled, dressed, eviscerated and carcass weights of broiler chickens offered T_1, T_2 and T_3 were comparable; the highest values of these carcass traits were recorded in birds fed T_4. This suggests that the inclusion of dried bitter leaf meal at a higher level as indicated in T_4 (diet containing 750g of dried bitter leaf meal per 100kg of feed) enhanced overall carcass performance of broilers. This agreed with the report of Yeigba and Tule (2022), who

observed improvement in growth performance of broiler offered bitter leaf extract. Though placed on T_2 and T_3 were lower but they had similar values. The broiler chickens fed diet 2 (T_2) had a significantly ($p<0.05$) highest value (75.58%) of dressing percentage comparable to 70.38 and 70.08% obtained in broiler chickens fed T_1 and T_3 respectively. The broilers fed T_4 had the least dressing percentage (68.11%).

Table. 1 Effect of Processed Bitter leaf meal on carcass characteristics of broilers at finisher phase

Carcass Traits	T1	T2	T3	T4
Live weight (g)	3033.33±0.04^{ab}	2733.33±0.04^{b}	2700.00±0.03^{b}	3466.67±0.04^{a}
Bled weight (g)	2700.00±0.04^{ab}	2633.33±0.04^{b}	2466.67±0.04^{b}	3166.67±0.04^{a}
Dressed weight (g)	2583.33±0.04^{ab}	2550.00±0.04^{ab}	2300.00±0.04^{b}	3000.00±0.04^{a}
Eviscerated weight (g)	2366.67±0.03^{ab}	2166.67±0.04^{b}	2133.33±0.05^{b}	2666.67±0.05^{a}
Dressing percentage (%)	70.38±0.92^{ab}	75.58±1.35^{a}	70.08±5.94^{ab}	68.11±2.74^{b}
Relative cut parts and organ weights (%)				
Head	1.68±0.43	2.08±0.08	2.07±0.27	2.13±0.27^{NS}
Wings	3.55±0.60	4.12±0.19	4.17±0.41	3.95±0.31^{NS}
Breast	24.14±2.87	26.81±1.81	23.94±4.74	23.67±2.06^{NS}
Back	6.38±2.55	7.84±3.74	8.36±1.98	7.18±0.75^{NS}
Thigh	3.64±0.45	4.71±0.81	3.55±1.38	4.34±0.97^{NS}
Drum stick	4.38±0.57	4.95±0.57	5.30±0.42	4.83±0.17^{NS}
Shank	1.19±0.34	1.79±0.50	1.82±0.32	1.60±0.22^{NS}
Neck	1.74±0.54^{b}	2.40±0.20^{ab}	3.09±0.81^{a}	1.91±0.10^{b}

abc: means within the same row having different super script differ significantly (P<0.05),
SEM±: Standard error of mean.

This result corroborates the findings of Peter *et al.* (2015) who observed significant higher dressing percentage in birds offered bitter leaf extract. Chaves *et al.* (2011) and Hong *et al.* (2012) also reported that dietary supplementation of broilers with natural phytochemicals improved quality parameters including carcass weight, dressing percentage and reduced abdominal fat. This result corroborates the findings of Peter *et al.* (2015) who observed significant higher dressing percentage in birds offered bitter leaf extract. Chaves *et al.* (2011) and Hong *et al.* (2012) also reported that dietary supplementation of broilers with natural phytochemicals improved quality parameters including carcass weight, dressing percentage and reduced abdominal fat. The relative neck weight showed significantly ($p<0.05$) variation with highest value recorded in broiler chickens fed T_3 (3.09 %) but numerically similar to 2.40 % obtained in broiler chickens fed T_2, followed by 1.91 and 1.74 % obtained in broiler chickens fed T_4 and T_1 respectively. Every other parameter measured showed statistical similarities ($P>0.05$) among birds placed on the other test diet. Daramola *et al.* (2018) obtained similar results in broilers fed diets containing different levels of bitter leaf meal. The observed similarity in the cut parts of broiler chickens fed the tests diets and the control diet. More so, this is expected because the cut parts are components of the live and carcass weight, and the higher live and carcass weights were recorded in broilers fed diets containing dried bitter leaf meal.

CONCLUSION

It is therefore concluded therefore that Processed Bitter leaf meal though aided higher whole carcass weight performance but had no impact on the cut weights. It is recommended also that higher level of inclusion be investigated into.

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