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Research Paper

An Evaluation of Growth Performance, Carcass Characteristics and Cost Benefits of Broiler Birds Fed Dietary Levels of Okra Meal at Two Stages of Maturity.

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Abstract
The study was conducted to evaluate the growth performance, carcass characteristics, organ weight and cost benefits of finishing broiler chickens fed dietary levels of immature and mature okra meals.one hundred and twenty six unsexed four weeks old ABORE ACRE broiler chickens with the average weight of 0.83kg were used for the study that lasted for four weeks. Significant (P<0.05) differences among treatments groups in weight gain, average daily feed intake, feed conversion ratio, mortality and feed cost per kg weight gain were observed. The study suggests that supplementing broiler diets with 5% immature okrahas a variety of growth-promoting effects in finishing broiler as the daily feed intake; daily weight gain and feed conversion ratio had similar significant values with the control.Economics of production revealed a decrease in the cost of feeding broilers with least cost in mature okra at both inclusion levels. However, the broiler chickens underutilized all the experimental diets when compared to the control diets for the feed intake and average final weight.
Keywords*: Okra; mature; Broiler chicken; immature; Growth*

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I. Introduction

Nigeria, according to Ojo (2003), is one of the developing nations with a dearth of animal protein. For example, the average Nigerian consumes only 9.0g of animal protein per day, compared to 53.3g for people in industrialized countries. Poultry firms hold an important place in the livestock industry of the agricultural business, according to Sanni and Ogundipe (2005), because poultry develop faster than other livestock and can thus be employed in the production of meats and eggs for human utilization in protein-deficient nations. In this vein, Adegbola, (2004) submitted that 41.23% of animal protein yield per annum in Nigeria is sourced from poultry meat and eggs, 9.79% from cattle and 12.43% from swine. Also, FAO (1995) argued that the excellent logical solution to scarcity of animal protein in Nigeria is to maximize broiler chicken production. Though it appears to be true, the most significant consideration in livestock management is the provision of feed. Poor productivity of cattle and poultry in the tropics is caused by a lack of feeds in the form of nutritionally unbalanced diets, the use of adulterated/ unwholesome substances, and the giving of expired feeds (Ogundipe*et al*., 2003).

Although, Poultry firm increases animal protein and contributes greatly to family income (Ogundipe and Sanni, 2002), the main focus of the poultry farmer is to reduce feed cost, which usually accounts for up to 70% of the total production cost (Igwebuike*et al*., 2001; Ogundipe, *et al*., 2003). Research stabs are now focused regarding evaluation of alternative feed ingredients for poultry. Atteh and Ologbenla (1993) argued that such alternatives should have similar nutritive composition that must be cheaper than the conventional protein and energy sources and should also be available in large quantities for the greater part of the year. Okra (*Abelmoschusesculentus*) is an important vegetable crop, originated from Ethiopia (Getachew 2001). According to Naveed*et al*. (2009), this crop is one of the most well-known and widely used *Malvaceae* species. In various parts of the universe, it is known by a variety of local names. (Nzikou*et al*. (2006)). In England, it's known as lady's finger; in the United States, it's known as gumbo; and in Ethiopia, it's known as Kenkase (Gemede*et al*., 2015).

Okra is a versatile crop, with pods, fresh leaves, buds, blossoms, stems, and seeds being used in a variety of ways. The succulent fruits of Okra (pods), which are eaten as vegetables, can be used dried, fresh, fried, or boiled in soups, salads and stews (Habtamu*et al*., 2014). Okra pod is a powerhouse of vital nutrients (Adetuyi*et al*., 2012) and an economical source of carbohydrates, protein, vitamins, minerals and dietary fiber, despite its nutritional contents (Habtamu*et al*., 2014). As a result, encouraging the cultivation of Okra pods could provide low-cost sources of nutrients that can improve nutritional status and reduce malnutrition, particularly among the poorest households in areas where they are produced in sufficient quantities; they could also be used as livestock feed.Mature okra fruits are considered agricultural waste products usually found in tropical markets during harvest periods. Although the crops are harvested when they are still succulent (immature) they become mature as a result of unfavorable storage condition when they are unsold.

The annualokra production in Nigeria has been estimated at 66 million tons. (Horn *et al*., 2007). Due to the increasing level ofokra production in the country, mature okra fruits are currently generated in large quantities. Presently, the proportion of these materials continue to increase in most market places as they are mostly dumped as waste in major okra producing communities (Nwofoke, 2016). However, traditional effort presently has been mostly geared towards cutting, sun drying and milling of mature okra fruits for soup making during scarcity (Osunde and Musa, 2007). In the absence of efficient utilization of the mature okra fruits, the huge quantity that are continually generated will become a great threat to the communities and market places where they are grown and sold, thereby causing a nuisance. More effective means of harnessing these waste products has become necessary in view of the environmental hazards they constitute in major producing areas and markets all over the country where they are distributed, some of which are in urban areas (Haryana, 2018; WHO, 1991). The current trend in animal production is to use agro by-products and agricultural wastes as optional feed additives in poultry and cattle feeding trials. The ultimate aim is to lower the cost of feeding animals which is becoming prohibitive in view of uneven economic fortunes of developing countries. The recent increase in the cost of feeding animals, particularly monogastric animals, as a result of the significantly increased cost of traditional feed components has necessitated a greater focus on developing alternative feed ingredients for feeding the animals. It is therefore necessary to channel research effort towards exploring avenues for utilizing most of the agro waste products including mature okra fruits in feeding animals. Such move will not only reduce production cost of animals, but would also serve as an avenue of effectively evacuating the waste in order to avert the environmental hazard and danger posed by these wastes. The resultant effect will lead to attainment of food security and agro- economic transformation. This study therefore, examines an evaluation of growth performance, carcass characteristics and cost benefits of broiler birds fed dietary levels immature and mature okra meals.

II. MATERIALS AND METHOD

Experimental Materials

Mature okra fruits were gathered at Ogbete market, Enugu while immature okra fruits were purchased at Eke market, Afikpo, Ebonyi state. All the materials were cut into sizes, sundried in 7 consecutive sunny days and milled with milling machine (harmer mill) after which they were analyzed for their proximate composition at shalom Laboratory, Nsukka. The materials were then included at 0, 5 and 10% in the experimental diets.

Experimental Diets

The experimental birds were fed starter and finisher compounded diets. The diets' components are shown in Tables 1 and 2. It is noteworthy that the starter diet did not contain the experimental materials (okra meal).

Table 1: Percentage Composition of the Starter Diet

Ingredient (%)	Maize	Wheat offal	PKC	GNC	Soya bean meal	Fish meal	Bone meal	salt	Methionine	lysine	premix	Total
Quantity(kg)	**45.57**	**5.06**	**4.51**	**18.05**	**20.30**	**2.26**	**3**	**0.5**	**0.25**	**0.25**	**0.25**	**100**

Calculated analysis:

Crude Protein	23%
Crude Fibre	5.00%
Energy Kcal/kg	3200

Table 2: Percentage Composition of the Experimental Diets

Feedstuff	T1	T2	T3	T4	T5
Mature okra meal	0.00	0.00	0.00	2.03	4.07

Immature okra meal	0.00	2.01	3.99	0.00	0.00
Maize	48.97	49.14	49.33	48.79	48.61
Wheat offal	5.44	5.46	5.48	5.42	5.40
PKC	4.03	2.01	0.00	2.03	0.00
GNC	16.14	16.06	15.98	16.22	16.30
Soya bean meal	20.17	20.08	19.97	20.27	20.37
Bone meal	4.00	4.00	4.00	4.00	4.00
Salt	0.5	0.5	0.5	0.5	0.5
Methionine	0.25	0.25	0.25	0.25	0.25
Lysine	0.25	0.25	0.25	0.25	0.25
Premix	0.25	0.25	0.25	0.25	0.25
Total	100	100	100	100	100
Calculated analysis					
Crude Protein	21	21	21	21	21
Crude Fibre	5.00	5.00	5.00	5.00	5.00

** To provide the following per kilogram of feed; vitA 10,000IU; vit. D3 1,500 IU; vit. E 2 mg; riboflavin 3 mg; pantothenic acid 10 mg; nicotinic acid, 2.5 mg; choline 3.5 mg; folic acid 1mg; magnesium 56 mg; lysine 1mg; iron 20 mg; zinc 50 mg; cobalt 1.25 mg.*The metabolizable energy of the test ingredient was calculated using prediction equation as reported by Pauzenga, 1985 with the formula M.E = 37 X %CP + 81.8 X %EE + 35.5 X%NFE

GNC =ground nut cake. PKC=Palm Kernel Cake. CP=crude Protein.CF=Crude Fibre.T1= control diet 0% immatureand mature okra fruits. T2= 5% immature okra fruits. T3= 10% immature okra fruits. T4= 5% mature okra fruits. T5= 10% mature okra fruits.

Table 3: The Proximate Compositions of the Experimental Diets

Treatment	Moisture content (g/100 g)	Crude protein (g/100g)	Total ash (g/100g)	Crude fiber (g/100g)	Crude fat (g/100 g)	Carbohydrate (g/100 g)
T1	10.72	22.20	5.19	5.19	3.70	53.00
T2	13.20	22.00	6.64	5.24	2.72	50.20
T3	14.01	21.80	6.82	5.26	2.11	50.00
T4	11.52	21.06	6.60	5.25	2.41	53.16
T5	10.80	21.83	6.91	5.30	2.98	52.18

T1= control diet 0% immature and mature okra fruits. T2= 5% immature okra fruits. T3= 10% immature okra fruits. T4= 5% mature okra fruits. T5= 10% mature okra fruits.

From Table 3, results of the proximate compositions of the diets showed that the crude fibre were 5.19,5.24, 5.26, 5.25, and 5.30 for T1,T2,T3,T4 and T5 respectively, all the values obtained were lower than the recommended 7% for finisher broiler (NRC,1994). However, the crude proteins (%) of 22.20, 22.00, 21.80, 21.06 and 21.83 for T1,T2,T3,T4and T5 respectively were higher than the crude protein requirements for finisher broilers (NRC,1994)

Experimental Birds and Management

Total of 70; Abore acre strains of broilers, aged 28 days with an average weight of 0.83kg ± 0.05kg were used for the study. The Birds were randomly assigned to five treatment groups in a completely randomized design involving dietary inclusion of three levels (0%, 5% and 10%) of immature okra fruits meal and mature okra fruit meal. Each treatment group was replicated twice to obtain a total of 10 replicates of 7 birds each. The chickens were randomly assigned to experimental pens of 1m x 1m each and raised in a deep liter system of management. Feed and water were given ad-libitum and proper routine management practices and medications strictly adopted. The feeding trial lasted for 28 days.

Measurements and Data collection

Data were collected on the initial body weight, final body weight, average daily weight gain, average feed intake, feed conversion ratio and mortality rate for the growth performance; Live body weight, de-feathered weight, eviscerated weight, thigh weight, wing weight, breast weight, back weight, shank weight, head and neck weight, for the carcasscharacteristicsand total cost of feed/kg weight, total cost of feed consumed/bird, total cost of production/bird, cost of sales/bird, profit made/bird for the cost implication of using the dietary levels of immature and mature okra meal in the broiler production.

The day old chicks were brooded together and were weighed at the beginning of the experiment and on weekly basis thereafter to determine the weight gain of the birds. Feed intake was recorded daily and was determined by the weigh back technique which involved obtaining the difference between quantity of feed offered and the left over in the following morning. Feed conversion ratio (FCR) was calculated from the data on feed intake and weight gain as the quantity of feed taken per kilogram of weight gain over the same period.

Determination of the carcass weights was done by starving all the birds over night at day 56, after which ten birds were randomly selected from all the treatments, one per replicate, they were tagged for identification, weighed, slaughtered by cutting of their throat with sharp knife and were bled. They were de-feathered and weighed again to determine the dressed weight. Eviscerated weight was determined by weighing the left over part after the intestines had been removed. Economic analysis was determined as follows: Total cost of feed ingredient used to formulate 100kg feed = cost of each ingredient x the quantity of the ingredient used in the formulation of 100kg of feed

Total cost of feed/kg = summation of the cost of feed ingredient used to formulate 100kg feed over 100

Total cost of feed consumed = total feed intake per bird × cost of 1 kg diet

III. Results

Proximate composition of experimental materials

Table 4 presents the proximate compositions of the experimental material and diet, respectively.

Table 4: Proximate composition of immature okra fruit and matureOkra fruit(dry weight bases)

Accessions	Moisture (g/100 g)	Crude protein (g/100 g)	ash (g/100 g)	Crude fiber (g/100 g)	Crude fat (g/100 g)	Carbohydrate. (g/100 g)
Mature okra meal	10.61	12.96	6.66	17.13	1.67	50.97
Immature okra meal	13.61	18.75	6.05	16.58	1.39	44.62

The results of the proximate compositions of mature okra meal and immature okra meal

Table 4 shows that mature okra meal and immature okra meal are rich in nutrients such as, ash; 6.66 and 6.05, carbohydrate; 50.97 and44.62 respectively but lower than the findings observed for a few chosen Nigerian vegetables (Adegbenro*et al*., 2012). Moisture contents were; 10.61m and 13.61while fibre contents were;17.13 and 16.58.The fibre values were higher than 8.38% and 8.00% recorded for *Sesbibiasesban*seed Ogunbode*et al*; 2013, but the crude protein;12.96 and 18.75 are comparable to the estimated average composition of 16 – 21% crude protein recorded for palm kernel cake (Asiedu, 1989).

Feed Cost per kg and 100kg

The feed cost per kg and 100kg are presented in Table 5

Table 5: Feed cost per kg and 100kg

Ingredient/ cost price/#	Cost price/ #/kg	T1#/kg	T2#/kg	T3#/kg	T4#/kg	T5#/kg
Mature okra meal	71.43	0	0	0	145	290.72
Immature okra meal	900	0	1809	3591	0	0
Maize	120	5876.4	5896.8	5919.6	5854.8	5833.2
Wheat offal	70	380.8	382.2	383.6	379.4	378
PKC	80	322.4	160.8	0	162.4	0
GNC	135	2178.9	2168.1	2157.3	2189.7	2200.5
Soya bean meal	180	3630.6	3614.4	3594.6	3648.6	3666.6
Bone meal	520	520	520	520	520	520
Salt	50	50	50	50	50	50
Methionine	750	750	750	750	750	750
Lysine	375	375	375	375	375	375
Premix	375	375	375	375	375	375
total cost/100kg(#)		14459	16101	17716	14450	14439
cost/bag(#)		3614.8	4025.3	4429	3612.5	3609.76
cost/kg(#)		144.59	161.01	177.16	144.5	144.39

GNC =ground nut cake. PKC=Palm Kernel Cake. CP=crude Protein.CF=Crude Fibre. T1= control diet 0% immature and mature okra fruits. T2= 5% immature okra fruits. T3= 10% immature okra fruits. T4= 5% mature okra fruits. T5= 10% mature okra fruits
# = Naira.

Growth performance of broiler chickens fed varying dietary levels of immature and mature okra meals
Data on growth performance of broiler chickens fed varying dietary levels ofimmature and mature okra meals is presented in Table 6.

Table 6: Growth performance values of finisher broiler chickens fed varying dietary levels of immature and mature okra meals.

Parameter	T1	T2	T3	T4	T`5
ILW/kg	0.87±0.0a	0.97± 0.1ab	0.87± 0.0a	0.85± 0.1 a	0.87 ± 0.1a
AFLW/kg	2.60± 0.1 a	2.09± 0.2bcd	1.77± 0.1 de	1.56± 0.2 e	1.64 ± 0.3de
ADWG/kg	0.04± 0.0abc	0.04± 0.0abc	0.04± 0.0bcd	0.04± 0.0 cd	0.035 ± 0.0d
DFI/kg/bird	0.14± 0.0ab	0.13± 0.0ab	0.12±0.0b	0.12± 0.0b	0.12 ± 0.0b
F C R	3.15± 0.0	3.14± 0.0	3.24±0.2	3.44± 0.5	3.56 ± 0.3
Mortality	0.00± 0.0	0.00± 0.0	0.00±0.0	0.00± 0.0	0.00 ± 0.0

[a,b,c,d,e] Different superscripts within each row indicate significant differences ($p < 0.05$) (n =10).
T1= control diet 0% immature and mature okra fruits. T2= 5% immature okra fruits. T3= 10% immature okra fruits. T4= 5% mature okra fruits. T5= 10% mature okra fruits , ILW= Initial live weight, AFLW= Average final live weight, ADWG= Average daily weight gain, DFI= Daily feed intake, F C R= feed conversion ratio.

Average final weight had a significant higher value (P < 0.05) when the mean value recorded for the control was compared with other treatments. However T2, T3 and T5 had similar values. However T4 was significantly decreased (P < 0.05) when compared with T2. For the average daily weight gain; the values recorded for T2, T3 and T4 did not significantly differ (P > 0.05) when compared with the control value. However, recorded for T5 was significantly lower (P < 0.05) than the control and T2**.** For the daily feed intake, feed conversion ratio and mortality; the control values were not significantly different (P > 0.05) when compared with T2, T3, T4, T5. Although there are differences but not statistically observed.

Carcass characteristics of broiler chickens fed varying dietary levels of Okra meal at different stages of maturity.
Data on carcass characteristics of broiler chickens fed varying dietary levels of Okra meal at different stages of maturity is presented in Table 7.

Table 7: Carcass characteristics values of finisher broiler chickens fed varying dietary levels of Okra meal at different stages of maturity.

Parameter	T1	T2	T3	T4	T5
FBW(kg)	$2.45{\pm}0.3^{ab}$	$2.35{\pm}0.1^{abc}$	$2.05{\pm}0.2^{abc}$	$1.55{\pm}0.2^{c}$	$1.85{\pm}0.1^{bc}$
DW(kg)	$2.25{\pm}0.3^{a}$	$2.05{\pm}0.1^{a}$	$1.85{\pm}0.2^{ab}$	$1.30{\pm}0.1^{b}$	$1.65{\pm}0.1^{ab}$
EW(kg)	$1.80{\pm}0.2^{a}$	$1.55{\pm}0.1^{a}$	$1.38{\pm}0.1^{ab}$	$0.88{\pm}.02^{b}$	$1.30{\pm}0.1^{ab}$
BW(kg)	$0.60{\pm}0.1^{a}$	$0.40{\pm}0.1^{b}$	$0.45{\pm}0.1^{b}$	$0.25{\pm}0.1^{d}$	$0.30{\pm}0.1^{c}$
Thigh(kg)	$0.45{\pm}0.1^{ab}$	$0.45{\pm}0.1^{ab}$	$0.45{\pm}0.1^{ab}$	$0.25{\pm}0.1^{c}$	$0.35{\pm}0.1^{bc}$
Back(kg)	$0.45{\pm}0.1^{a}$	$0.25^{+}0.1^{bc}$	$0.20{\pm}0.0^{c}$	$0.20{\pm}0.1^{c}$	$0.25{\pm}0.1^{bc}$
H and N(kg)	0.15±0.1	0.20±0.1	0.13±0.1	0.06±0.1	0.20±0.1
Wing(kg)	0.20±0.0	0.25±0.1	0.15±0.1	0.13±0.1	0.20±0.0

[a,b,c] Means with different superscripts within each row indicate significant differences (P < 0.05) (n =10). Without superscript = not significant. T1= control diet 0% immature and mature okra fruits. T2= 5% immature okra fruits. T3= 10% immature okra fruits. T4= 5% mature okra fruits. T5= 10% mature okra fruits,FBW= Final body weight, DW= Dressed Weight, EW=Eviscerated weight, BW=Breast weight, H and N= head and neck

For the final body weight, dressed weight, eviscerated weight, breast weight and thigh weight; no significant difference (P > 0.05) was observed when the T2, T3and T5 were compared with the control values.

However, T4 had the least significant values (P < 0.05).For the back weight;the control value was significantly higher (P < 0.05)than other treatments. However, T2,T3,T4 and T5 had similar values.There was no significant difference among all the treatments for the wing, head and neck (P > 0.05)

Effect of immature okra meal and mature okra meal on economic analysis of finisher broiler chickens

Effect of immature okra meal and mature okra meal on economic analysis of finisher broiler chickens is presented in table 8.

Table 8: Effect of immature okra meal and mature okra meal on economic analysis of finisher broiler chickens

Parameter	T1	T2	T3	T4	T5
DOC cost/#	350	350	350	350	350
Cost of feed/kg/#	144.59a	161.01b	177.16c	144.5a	144.39a
Feed intakecost(#/bird)	560.72a	601.86b	610.14b	495.64c	493.24c
Feed cost/kgweight gain(#)	506.07a	531.33a	531.48a	456.62b	433.17c
Cost of production(#/bird)	910.72a	951.86b	960.14b	845.64c	843.24c

[a,b,cd,e] Different superscripts within each row indicate significant differences (*p* < 0.05) (n =2). Without superscript = not significant. T1= control diet 0% immature and mature okra fruits. T2= 5% immature okra fruits. T3= 10% immature okra fruits. T4= 5% mature okra fruits. T5= 10% mature okra fruits,.DOC=day old chicks.

No significant difference was observed when the costs of diets containing mature okra at both inclusion levels were compared to the cost of the control feeds. However, the costs of feeds containing immature okra at both inclusion levels were significantly increased when compared to the control for the cost of feed/kg. For the cost of feed intake and total cost of production, the values recorded for the control were significantly higher than the values recorded for all the treatments, whereas mature okra at both inclusion levels had the least values.

IV. Discussion

Performance of broiler chickens fed varying dietary level of immature okra meal, mature okra meal

As shown in tables 6, there were significant differences among dietary treatments on growth performance of the experimental birds (p<0.05). For the Average final weight, the values recorded for the birds on 5% and 10% okra meal at both stages of maturity were significantly (p<0.05) decreased when compared to the control. This is an indication that both immature and mature okra meal were not maximally utilized by the chickens in this study, the poor performance of the chickens could be attributed to high level of anti-nutritional factors such as tannin presence in the diets. This also agrees with the report of Aletor, 1993 that, tannin in the biological system has the ability to chelate protein thereby impeding digestion.

For the Average daily weight gain; No significant difference (p>0.05) was observed when the birds on 5%, 10% immature Okra meal and 5% mature okra meal were compared to the control but significantly declined (P<0.05) at 10% inclusion of mature okra. This decrease could be due to the higher fibre level in the diets at this inclusion level which lead to reduction in feed intake thereby the weight gain was negatively affected. For the average Daily feed intake,no significant difference (P>0.05) was observed when the control was compared with all the treatments. This is an indication that the finishing broiler chickens accepted both immature and mature okra meal at the two stages of maturity. The maximum acceptability of the diet at these inclusion levels could be attributed to the texture of the diets**.** For the feed conversion ratio, no significant difference (P>0.05) was observed among the treatments. However, the birds on 5% inclusion of immature okra meal had the least mean values, although not statistically shown. This is an indication that finisher broilers can convert up to 10% inclusion of all the experimental materials when fed into high quality meat. The good performance of all the experimental materials in this study might be attributed to the processing method of the experimental materials; the methods of milling (fine meal) may also have contributed to the high degree of absorption which facilitated the degree of conversion of the nutrients into muscles. These agree with the report of Okorie, 2006 who argued that the method of milling may have aided the buildup of the muscular and structural tissues of the experimental broilers.

Carcass yield of broiler chickens fed varying dietary level of okra meal at two stages of maturity

As shown in table7, the Live body weight, dressed weight, eviscerated, breast weight and thigh had no significant difference (p>0.05) when all the treatments mean values were compared with the control value except for the value recorded for the birds on mature okra at 5% inclusion level which was significantly declined. The similar values recorded for the control, T2,T3 and T5 is evidence that the experimental diets were well utilized by the finisher broilers. The optimum conversion of the diet to meat at these inclusion levels could be attributed tothe facilitation of the dietary nutrient balanced in the experimental diets .

Cost analysis of broiler chickens fed varying dietary level of immature okra meal, mature okra meal
As shown in table 8, there were significant differences among dietary treatments.

No significant difference was observed when the two inclusion levels of okra meal at mature stage of maturity were compared to the control for the cost of feed/kg. This is an indication that mature okra mealwas used to formulate comparable cheap diets with the control up to 10% inclusion. The favorable comparism between these treatments was as the result of the fact that these ingredients are considered waste and not bought, hence, made it cheaper and available to be used. However, the values recorded for 5% and 10% of okra meal were significantly higher. The significant increase could be attributed to the high cost of immature okra as they are staple food for humans. This is in line with Ajayi*et al* 2020 who argue that competition between man and industries is the base for escalating prices of feed ingredients. For the cost of feed intake and total cost of production; The values recorded for the control were significantlyhigher than what was observed for other treatments. The increase could be attributed to the high cost ofimmature okra as they are staple food for humans. A linear increase was observed as the level of inclusion of immature okra meal increased, but drastically declined at inclusion of mature okra meal. This agrees with (Damron and Sloan, 1998). Who argued that An ideal broiler diet is one that will maximize production at the least cost.However, a costly diet may produce phenomenal gains in live-stock, the cost per unit of production may make the diet economically infeasible. Likewise, the cheapest diets will not always be the best since it may not allow for maximum production. For feed cost/kg weight, no significant difference was observed when the T2 and T3 were compared with the control value. However, T4 and T5 were significantly lower than the control value.The significant lower values recorded for mature okra at both inclusion levels could be attributed to the high cost of immature okra mealwhereas mature okraswere picked without any cost in this study.

V. Conclusion and Recommendation

The results of the present study showed that okra meal at the two stages of maturity can be incorporated up to 10% in feeding of finisher broiler without compromising the growth. The results demonstrate that the observed benefits can be achieved without compromising economic profits only with the incorporation of 5% and 10% mature okra meals . The findings of this study are evidence that the use of okra at 5% and 10% inclusion level will make mature okra fruits to be ideal for broiler production. The utilization of mature okra fruits will also be an efficient means of averting the environmental hazard and danger likely to be posed by the increasing generation of the mature okra fruits in the market places and communities where they are grown. The resultant effect will lead to attainment of food security, national transformation and social emancipation among the citizenry.

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