Growth Performance and Cost Benefits of Broilers Fed Diets Containing *Ipomoea asarifolia* Leaf Meal

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ABSTRAK

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Percobaan dilakukan untuk melihat performa pertumbuhan ayam pedaging dan keuntungan dari pemberian pakan dengan penambahan tepung daun *Ipomoea asarifolia* (CIALM). Tepung daun *Ipomoea asarifolia* sebanyak 0; 2,5; 5 dan 7,5% secara berurutan dimasukkan ke dalam 8 pakan untuk membentuk perlakuan T1, T2, T3 dan T4 untuk fase *starter* dan *finisher*. Seratus dua puluh ekor ayam pedaging digunakan dalam percobaan selama delapan minggu dan dirancang dengan Rancangan Acak Lengkap. Dilakukan penghitungan untuk konsumsi pakan harian, pertambahan berat badan mingguan, rata-rata konsumsi pakan harian, rata-rata pertambahan berat badan harian, total pakan yang dikonsumsi, rasio konversi pakan dan parameter *cost benefit*. Pada fase *starter* menunjukkan perbedaan (P<0,05) antar rerata perlakuan pada semua parameter kecuali bobot awal. Terdapat perbedaan (p<0,05) antara rata-rata perlakuan dalam semua parameter yang diukur selama fase *finisher* termasuk parameter analisis biaya. Berbeda dengan biaya pakan yang menunjukan penurunan dengan meningkatnya kadar CIALM. Keuntungan bersih menurun pada perlakuan T1 dan T4 yang disebabkan oleh penurunan total pertambahan berat badan. Pertambahan berat akhir, pertambahan berat total, rata-rata konsumsi pakan harian, konsumsi pakan total, rata-rata pertambahan bobot harian, rasio konversi pakan, biaya pakan dan biaya pakan per kg kenaikan berat badan menurun dengan meningkatnya kadar CIALM. Hasil yang diperoleh dalam percobaan ini menunjukkan bahwa pakan kontrol lebih baik daripada pakan dengan perlakuan. Hasil yang positif diakibatkan oleh tingkat inklusi yang lebih rendah yaitu kurang dari 2,5%.

Kata Kunci; Ayam Pedaging, Keuntungan, Performa Pertumbuhan, *Ipomoea asarifolia*

ABSTRACT

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This experiment was conducted to determine growth performance and cost benefit of including cooked *Ipomoea asarifolia* leaf meal (CIALM) in broiler diets. Eight diets were compounded by including *Ipomoea asarifolia* leaf meal at 0, 2.5, 5 and 7.5% to form T1, T2, T3 and T4 respectively of both starter and finisher diets. One hundred and twenty broiler birds were used in a Complete Randomized Design experiment that lasted for eight weeks. Daily feed intake and weekly weight gain were measured. Average daily feed intake, average daily weight gain, total feed consumed, feed conversion ratio and cost benefit parameters were calculated. In starter phase results showed that there were significant differences (P<0.05) between treatment means in all the parameters except initial weight of the birds. There were significant differences (p<0.05) between treatment means in all the parameters measured during the finisher phase including the cost analysis parameters except that feed cost decreasing with increasing levels of CIALM and net profit decreased from T1 to T4 because of the decrease in total weight gain from T1 to T4. Final weight gain, total weight gain, average daily feed intake, total feed intake, average daily weight gain, feed conversion ratio, feed cost and feed cost per kg weight gain all decreased with increasing levels of CIALM. Results control diet performed better than other treatment diets which suggest that lower levels of inclusion that is less than 2.5% may give positive results.

Key Words; Broiler Chicken, Cost Benefit, Growth Performance, *Ipomoea asarifolia*

INTRODUCTION

The science of nutrition involves providing a balance of nutrients that best meets the need of an animal for optimal growth and effective metabolic activities. For economic reasons, the supply of nutrients should be at the least possible cost. Therefore, other feed alternatives that could possibly meet the nutrient requirement at a cheaper rate should be opted for (Ranjhan 2001).

Food and Agricultural organization (FAO 2010) estimated that the average Nigerian consumes 51g of protein per day which is less than the recommended 86g per day. The animal protein shortage in the diets of Nigerians and people from developing countries is now a matter of urgent concern and measures to save people from imminent protein malnutrition are imperative. It therefore becomes essential to increase animal production in order to meet the recommended daily protein need.

In broiler production, the cost of getting the normal conventional feed sources is so expensive and keeps rising by the day. This has become more uneconomical for the farmer as this alters the main aim of the farmer which is profit maximization, by using readily and cheap available feed sources during production. Studies have shown that providing a balanced broiler feed is one of the challenges of the farmer. This has contributed to the recent decline in poultry production. (Esonu et al. 2001), stated that more than 50% of Nigerian farmers have closed down and another 30% forced to reduce production capacity due to shortage of feed.

The present shortage of animal feed have been blamed on the ever increasing cost of feed ingredients which (Esonu et al. 2001), and Madubuike & Ekenyem (2001) have rated at 70% to 80% arising from protein sources. This is as a result of increasing competition between man and animal for available grains (Ahitey & Flake 2008; Aviagen 2019). Poultry feed diets consist of carbohydrate and protein of both plant and animal protein sources, mineral, vitamins and fats and these are also required in the human diet.

The protein deficit in livestock production in Nigeria and most developing countries of the world is now a matter of urgent concern and measures are being put in place to save people from imminent protein malnutrition. Nwakpu et al. (2010); Ekenyem (2002) and Esonu et al. (2003), have suggested that immediate search for cheap and readily available protein and energy sources particularly those that are not competed for between man and animal is important.

The recommended policy is to identify and use locally available feed resources to formulate diets that are as balanced as possible (Kakengi et al. 2007). There is the need, therefore, to explore the use of non-conventional feed sources like *Ipomoea asarifolia* leaf meal (CIALM) that have the capacity to yield the same output as conventional feeds, and perhaps at cheaper cost.

The economization of feed cost using cheaper and unconventional feed resources is an important aspect of commercial poultry production (Muriu et al. 2002). This strategy could help to reduce the cost of production, and ensure cheaper meat production thereby freeing up the major crops for human consumption (Olugbemi et al. 2010).

These Non-conventional feed sources can be put to use for animal feed formulation as there is no competition between animals and humans for these feed stuffs. In this direction, Esonu et al. (2003) have suggested that leaf meal of tropical legumes and browse plants should be used as potential sources of cheap animal feed source. Leaf meals do not only provide protein, but also some essential vitamins such as vitamins A and C, minerals, etc. (Gadzirayi et al. 2011).

This trial seeks to assess the effects of varying dietary inclusion levels of cooked *Ipomoea asarifolia* leaf meal (CIALM) in the growth performance and carcass quality of broiler. In Nigeria, the leaf of *Ipomoea asarifolia* has no known food value and thus popularly used as compost material, mulch, as well as constituting weed in farms. Thus with a crude protein level of 32%, metabolizable energy of 2760kcal/kg and good mineral profile, *Ipomoea asarifolia* leaf has the potential as a cheap feed ingredient for broilers. However, this great potential which could transform our poultry production industry has hardly been utilized. Cooking has also been seen as a way of reducing the level of anti-growth factors as reported by (El-Adawy 2002). There seems to be lack of information regarding its usage and possible effects on poultry production. There is therefore a high and urgent need to carry out a comprehensive study on this regard. This study would enlighten poultry producers on the potentials of adding *Ipomoea asarifolia* leaf meal in the diets of broiler.

MATERIALS AND METHODS

Location and duration of experiment

The experiment was carried out at the teaching and research Poultry farm of the Department of Animal Science and technology, Faculty of Agriculture, Nnamdi Azikiwe University Awka, Anambra State Nigeria. The experiment lasted for a period of 2 months. The location lies between latitude 6.24˚N and 6.28˚N and Longitude 7.00˚E and 7.08˚E on the South Eastern part of Nigeria. The climate is the tropical wet and dry type with clearly distinguished seasons. The mean daily maximum temperature is usually 27˚c all year round although it could get to as high as 34˚C in March and lowest during the harmattan season between December and January. The mean annual rainfall according to the Local Meteorological station which has maintained records since 1978 is about 1600mm with a relative humidity of about 80% at dawn.

Preparation of cooked *Ipomoea asarifolia* leaf meal (CIALM)

Fresh *Ipomoea asarifolia* leaves were harvested green from the bush prior to flowering. The leaves were washed, chopped to facilitate easy boiling and then it

Table 1. Composition of broiler starter diets

Ingredients	T1	T2	T3	T4
Maize, (%)	44	44	44	44
Wheat offal, (%)	8.3	7.3	5.8	4.3
Brewers dry grain, (%)	4.0	4.0	4.0	4.0
Soya bean meal, (%)	21.2	20	19.2	19.0
Leaf meal (CIALM), (%)	0.00	2.50	5.00	7.50
Groundnut cake, (%)	11.5	11.2	11	10.2
Fish meal, (%)	4	4	4	4.0
Bone meal, (%)	2	2	2	2
Oyster shell, (%)	3	3	3	3
Iodized salt, (%)	0.25	0.25	0.25	0.25
Lysine, (%)	0.25	0.25	0.25	0.25
Methionine, (%)	0.25	0.25	0.25	0.25
Premix, (%)	0.25	0.25	0.25	0.25
Mycotoxin binder, (%)	1	1	1	1
Calculated chemical composition (DM)				
Total, (%)	100	100	100	100
Crude protein, (%)	22.5	22.214	22.034	21.835
Crude fiber, (%)	4.39	5.34	6.28	7.41

T1= 0% tepung daun *Ipomoea asarifolia*, T2= 2.5% tepung daun *Ipomoea asarifolia*, T3= 5% tepung daun *Ipomoea asarifolia*, T4= 7.5% tepung daun *Ipomoea asarifolia*

was boiled at 100^{o}C for 2 minutes and immediately sun-dried by spreading under the sun (Ncube et al. 2015). The dried leaves were then milled, sieved and incorporated into the treatment diets.

Experimental diets

Eight experimental diets were formulated by including CIALM at 0, 2.5, 5, and 7.5% levels to form T1, T2, T3, and T4 for both starter and finisher diets respectively (Table 1 and Table 2).

Experimental design and experimental birds

Complete Randomized Design (CRD) was adopted for this study. A total of 120 broiler chicks were used for this experiment. The birds were grouped into four treatments with 30 birds per treatment and three replications of 10 birds each. The four treatments were tagged T1, T2, T3 and T4 containing cooked *Ipomea asarifolia* leaf meal (CIALM) at 0, 2.5, 5, and 7.5% at dry matter bases, respectively. The experiment was conducted in two phases; phase one and phase two. The phase one experiment lasted for a period of 0 to 4 weeks and the broilers were fed with broiler starter while the phase two was between 4 weeks to 8 weeks and the broilers were fed with the broiler finisher diet.

Vaccination and medication

A vaccination program was planned and followed carefully. The procedure for vaccination was recommended by the Veterinary Services and the dosage was according to the manufacturer's specifications.

Housing and management

The birds were housed in deep litter pens. Wood shavings were used as litter material for the birds. To ensure a clean bedding material at all times, the litter material was changed fortnightly. Each bird had an average floor space of 1.3sq ft. (0.397 m^2). Heating system for the brooding periods was charcoal pots.

Feeding and Watering

The birds were given a weighed quantity of feed every morning but were having an ad libitum access to both feed and water.

Parameters that were measured

The parameters that were measured include: daily feed consumption (feed intake) and weekly body weight.

Table 2. Composition of broiler finisher diet

Ingredients	T1	T2	T3	T4
Maize, (%)	50	49	48	47
Full fat soya, (%)	5	5	5	5
Brewers dry grain, (%)	10	9.5	9	8.5
Soya bean meal, (%)	16	15	14	13
Leaf meal (CIALM), (%)	0	2.5	5	7.5
Groundnut cake, (%)	7.0	7.0	7.0	7.0
Fish meal, (%)	3	3	3	3
Bone meal, (%)	3	3	3	3
Limestone, (%)	3	3	3	3
Iodized salt, (%)	0.5	0.5	0.5	0.5
Lysine, (%)	0.5	0.5	0.5	0.5
Methionine, (%)	0.5	0.5	0.5	0.5
Premix, (%)	0.5	0.5	0.5	0.5
Mycotoxin binder, (%)	1	1	1	1
Calculated chemical composition (DM)				
Total, (%)	100	100	100	100
Crude protein, (%)	19.93	19.8	19.67	19.54
Crude fiber, (%)	4.73	5.67	6.64	7.925

T1= 0% tepung daun *Ipomoea asarifolia*, T2= 2.5% tepung daun *Ipomoea asarifolia*, T3= 5% tepung daun *Ipomoea asarifolia*, T4= 7.5% tepung daun *Ipomoea asarifolia*

Calculated parameters

The calculated parameters were: average daily feed intake, average daily weight gain, total feed consumed, feed conversion ratio, feed cost, cost of feed per kg weight gain, total cost of production, gross profit, net profit, economic efficiency and return on investment

Statistical analysis

Data collected was computed and subjected to analysis of variance (ANOVA) using SPSS software and differences between means were separated using the Duncan's (1955) multiple range test at significance level of 5%.

Animal ethics and welfare

The experiment was performed according to animal ethics and welfare of Nnamdi Azikiwe University Awka.

RESULTS AND DISCUSSION

Proximate and phytochemical composition of cooked *Ipomoea asarifolia* leaf meal

The proximate and phytochemical composition of cooked *Ipomoea asarifolia* leaf meal is presented in Table 3 and Table 4 respectively. The proximate analysis of the cooked *Ipomoea asarifolia* leaf meal (CIALM) showed that the crude protein reduced from 32% to 18.8% thus disagreeing with Frias et al. (2000) who reported that Cooking pods in water, with or without pressure increases the protein quality. It can also be seen from the results that there was reduction in the ash, fat and carbohydrate levels of the cooked *Ipomoea asarifolia* leaf meal (CIALM) when compared to the uncooked one and this is in agreement with El-El-Adawy (2002) who reported that cooking caused significant decreases in protein, fat, total ash, carbohydrate fractions and anti-nutritional factors.

The result of the phytochemical analysis of cooked *Ipomoea asarifolia* leaf meal also showed a considerable decrease in the anti-nutritional factors and this is in agreement with El-Adawy (2002) who reported that cooking caused a significant decrease in anti-nutritional factors.

Growth performance of birds fed diets containing cooked *Ipomoea asarifolia* leaf meal during the starter phase

Table 5 shows the effect of cooked *Ipomoea asarifolia* leaf meal (CALM) on the growth performance of broiler during the starter phase. The result of the starter phase shows that there was no significant difference ($p>0.05$) in the initial weight of the birds. However significant differences ($p<0.05$)

Table 3. Proximate analysis of cooked *Ipomoea asarifolia* leaf meal (CIALM)

Nutrient	(%)
Moisture content	12.5
Ash	9.25
Fat	1.0
Fiber	45
Protein	18.33
Carbohydrate	13.67

Table 4. Phytochemical analysis of cooked *Ipomoea asarifolia* leaf meal (CIALM)

Phytochemical	(%)
Flavonoid	4.70
Alkaloid	4.50
Pytate	5.0
Tannin	0.87
Saponin	1.60

existed among treatment means on the final weight, total weight gain, average daily weight gain, total feed intake, average daily feed intake, feed conversion ratio, feed cost and feed cost per kg weight gain. The final weight, total weight gain, average daily weight gain, total feed intake, feed cost and average daily feed intake decreased with increasing levels of cooked *Ipomoea asarifolia* leaf meal. However, no significant difference (p>0.05) existed between treatment means of T1 (0% CIALM) and T2 (2.5% CIALM) but significant differences (p<0.05) existed between treatment means of T3(5%) and T4(7.5% CIALM). The results of feed conversion ratio and feed cost per kg weight gain showed that T3 (5% CIALM) was significantly different (p<0.05) and better than other treatments means while T1 (0% CIALM), T2 (2.5% CIALM) and T4 (7.5% CIALM) showed no significant difference (p>0.05) between treatment means of the feed conversion ratio and feed cost per kg weight gain. This means that T3 (5% CIALM) was able to utilize feed efficiently when compared to T1 (0% CIALM), T2 (2.5% CIALM) and T4 (7.5% CIALM). As a result of this, the feed cost per kg weight gain of T3 (5% CIALM) was lower than T1 (0% CIALM), T2 (2.5% CIALM), and T4 (7.5% CIALM) thus implying that it cost less to produce a kg of feed in T3 (5% CIALM). This means that even though T3 (5% CIALM) consumed less when compared to T1 (0% CIALM) and T2 (2.5% CIALM) and weighed less than them, they were able to utilize their feed more efficiently and thus cost less. This agreed with the work of (Ferket & Gernat 2006), who reported that feed intake influences final body weight and feed conversion.

Growth performance of birds fed diets containing cooked *Ipomoea asarifolia* leaf meal (CIALM) during the finisher phase

Table 6 shows the growth performance of broiler fed diets containing cooked *Ipomoea asarifolia* leaf meal (CALM) at the finisher phase.

There was no significant difference (p>0.05) in the feed cost per kg weight gain among treatment means but significant differences (p<0.05) existed between treatment means of the final weight gain, the total weight gain, the average daily feed intake, the total feed intake, feed conversion ratio and feed cost with T1(0% CIALM) being significantly higher than other treatments, followed by T2(2.5% CIALM), T3(5% CIALM) and T4(7.5% CIALM) respectively. This means that there was a decrease in final weight gain, the total weight gain, the average daily feed intake, the total feed intake, feed conversion ratio and feed cost as the level of inclusion increased. The poor performances of the birds fed cooked *Ipomoea asarifolia* leaf meal can be attributed to the high crude fiber content in the feed. Generally, the use of leaf meals in broiler diets may be limited by their high content of crude fiber (Santoso & Sartini 2001; Ubua et al. 2019) but cooking it seemed to increase the crude fiber content even more which is in agreement with Emenike et al. (2016), Rehinan et al. (2004) who reported that cooking increases dietary fiber content and also induces losses of vitamins and minerals. These poor performances can be attributed to the fiber content of the feed, increased crude fiber in the cooked *Ipomoea asarifolia* leaf meals which increased the fiber content of the feed. Tesfaye et al. (2013) suggested that the increased fiber content in rations with the increased levels of leaf meal may consequently depress feed intake and thus growth performance of broilers. The fiber may increase the bulkiness in the gastrointestinal tract and thereby reduce feed consumption (Buragohain 2016).

This experiment of adding cooked *Ipomoea asarifolia* leaf meal can be compared with uncooked *Ipomoea asarifolia* leaf meal with reference to the work done by Ekenyem & Madubuike (2005). It can be seen that the uncooked *Ipomoea asarifolia* leaf meal though containing high level of phytochemical seemed to perform better than the cooked *Ipomoea asarifolia* leaf meal at inclusion levels of 0%, 5%, 10% and 15%. This was even at higher treatment levels than the cooked *Ipomoea asarifolia* leaf meal of inclusion levels of 0%, 2.5%, 5% and 7.5%, and this can particularly be attributed to the high fiber content of the cooked *Ipomoea asarifolia* leaf meal which made up almost 50 percent of the leaf meal and this produced a harmful

Table 5. Growth performance of birds fed diets containing cooked *Ipomoea asarifolia* leaf meal (CIALM) during the starter phase

Parameters	T1	T2	T3	T4	SEM	Pvalue
Initial weight, (g/bird)	38.733	38.60	38.57	38.87	0.29	0.988
Final weight gain,(g/bird)	606.63^{c}	579.46^{c}	482.07^{b}	377.97^{a}	27.59	0.000
Total weight gain,(g/bird)	568.07^{c}	540.86^{c}	443.50^{b}	339.60^{a}	27.53	0.000
Average daily weight gain, (g/bird)	19.58^{c}	18.65^{c}	15.47^{b}	11.85^{a}	0.93	0.000
Total feed intake, (g/bird)	1175.67^{c}	1171.27^{c}	840.25^{b}	759.07^{a}	57.80	0.000
Average daily feed intake, (g/bird)	40.53^{c}	40.39^{c}	28.97^{b}	26.18^{a}	1.99	0.000
Feed conversion ratio	2.06^{b}	2.16^{b}	1.87^{a}	2.21^{b}	0.04	0.003
Feed cost,(₦)	180.26^{c}	176.54^{c}	125.18^{b}	111.90^{a}	9.26	0.000
Feed cost per kg weight gain, (₦)	317.39^{b}	326.06^{b}	279.09^{a}	326.29^{b}	6.52	0.003

abc means on the same row with different superscripts are significantly different at 5%. T1= 0% tepung daun *Ipomoea asarifolia*, T2= 2.5% tepung daun *Ipomoea asarifolia*, T3= 5% tepung daun *Ipomoea asarifolia*, T4= 7.5% tepung daun *Ipomoea asarifolia*

Table 6. Growth performance of birds fed diets containing cooked *Ipomoea asarifolia* leaf meal during the finisher phase

Parameters	T1	T2	T3	T4	SEM	P value
Final weight gain, (g/bird)	2271.63^{d}	2010.82^{c}	1646.00^{b}	1339.77^{a}	106.93	0.000
Total weight gain, (g/bird)	1680.20^{d}	1431.51^{c}	1160.73^{b}	961.80^{a}	82.34	0.000
Average daily feed intake, (g/bird)	60.02^{d}	51.12^{c}	40.14^{b}	34.35^{a}	3.00	0.000
Total feed intake, (g/bird)	3517.27^{d}	3059.08^{c}	2588.03^{b}	2406.43^{a}	130.41	0.000
Feed conversion ratio	2.09^{a}	2.13^{a}	2.30^{b}	2.50^{c}	0.52	0.000
Total Feed cost, (₦)	533.39^{d}	453.66^{c}	370.80^{b}	326.31^{a}	23.84	0.000
Feed cost per kg weight gain, (₦)	317.22^{a}	316.39^{a}	331.81^{ab}	339.45^{b}	3.81	0.051
Total weight gain overall, (₦)	2233.90^{d}	1972.20^{c}	1607.87^{b}	1300.90^{a}	106.93	0.000

abc means on the same row with different superscripts are significantly different at 5%. T1= 0% tepung daun *Ipomoea asarifolia*, T2= 2.5% tepung daun *Ipomoea asarifolia*, T3= 5% tepung daun *Ipomoea asarifolia*, T4= 7.5% tepung daun *Ipomoea asarifolia*

Table 7. cost analysis of broiler birds fed cooked *Ipomoea asarifolia* leaf meal(CIALM)

Parameters	T1	T2	T3	T4	SEM	P value
Gross profit, (₦)	2725.92^{d}	2412.99^{c}	1975.20^{b}	1607.72^{a}	128.31	0.000
Net profit, (₦)	1509.27^{d}	1282.69^{c}	977.23^{b}	669.50^{a}	95.84	0.000
Return on investment, (₦)	1.25^{d}	1.14^{c}	0.98^{b}	0.71^{a}	0.06	0.000
Economic efficiency	2.25^{d}	2.14^{c}	1.98^{b}	1.71^{a}	0.06	0.000
Feed cost, (₦)	713.65^{d}	630.20^{c}	497.98^{b}	438.22^{a}	438.22	0.000

abc means on the same row with different superscripts are significantly different at 5%. T1= 0% tepung daun *Ipomoea asarifolia*, T2= 2.5% tepung daun *Ipomoea asarifolia*, T3= 5% tepung daun *Ipomoea asarifolia*, T4= 7.5% tepung daun *Ipomoea asarifolia* effect on the performance of broiler although their control was better. In the case of uncooked *Ipomoea asarifolia* leaf meal, inclusion levels of 5 percent and 10 percent seemed to have performed better whereas in this case, inclusion of 5 percent and 7.5 percent was highly deleterious and negatively affected their performance.

Cost analysis of broiler birds fed cooked *Ipomoea asarifolia* leaf meal (CALM)

Table 7 shows the cost analysis and economic evaluation of the dietary inclusion of cooked *Ipomoea asarifolia* leaf meal (CIALM) on broiler diets. The results of the economic evaluation of birds fed cooked *Ipomoea asarifolia* leaf meal showed significant differences ($p<0.05$) in the gross profit, net profit, return on investment, economic efficiency and total cost of feed consumed. The gross profit, net profit, return on investment, economic efficiency and feed cost decreased with increasing levels of cooked *Ipomoea asarifolia* leaf meal. The total feed cost for T1 (0%) was higher while the total feed cost for T4 (7.5%) was lowest which implies that the leaf meal was a cheaper feed source. This is in agreement with Esonu et al. (2003) who suggested that leaf meal of tropical legumes and browse plants should be used as potential sources of cheap animal feed source. However, T1 (0%) was better in terms of the gross profit, net profit, return on investment and economic efficiency and T4 (7.5%) was the lowest thus showing that even though the feed cost was cheaper with higher levels of inclusion, the farmer made more profit with reduced inclusion levels because the ones with higher inclusion levels showed high feed conversion ratio values. This implies that for them to add more weight they need to eat more feed which cannot be efficiently converted to meat as a result of the high fiber content thus making the control diet more profitable. This is in agreement with the work of Ugwuowo et al. (2019) which reported that there was significant differences between treatment means on gross profit, net profit, economic efficiency and return on investment of birds fed *Moringa oliefera* leaf meal and the economic indices reduced as the inclusion levels increased. The economic indices of broilers fed varying dietary levels of sun dried neem leaf meal (NLM) Which was investigated by Onyimonyi & Ernest (2009) was also in agreement with this trend as there was decrease in profit as the leaf meal inclusion level increased.

CONCLUSION

The results show that broiler birds in T1 (0% CIALM) performed better than the birds in the other treatments. Cooking affected the nutrient composition of *Ipomoea asarifolia* and reduced the quality of the feed as the level of inclusion of cooked *Ipomoea asarifolia* leaf meal (CIALM) increased. Therefore, uncooked *Ipomoea asarifolia* leaf meal is better than the cooked one (CIALM) in broiler diets.

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