BIBLIOGRAPHY

SEG-IDEN, CHERRY MAE T. APRIL 2013. Carcass Characteristics of Native Chickens Given Sweet Potato Leaves (*Ipomoea batatas* l.). Benguet State University, La Trinidad, Benguet.

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ABSTRACT

The study was conducted at the BSU Poultry Experimental Area, Balili, La Trinidad, Benguet from October 29 – January 18 2013 to evaluate and compare the carcass characteristics of native chickens given sweet potato leaves and commercial feeds. Specifically, this study aimed to measure the carcass yield of sample birds in terms of dressed weight; dressing percentage; percentages of the major cuts, minor cuts, and viscera; lean, bone, skin yield of the carcasses; and analyze the nutrient composition of the carcasses through proximate analysis.

A total of 12 sample birds were taken from a growth study. The birds were distributed following the Randomized Complete Block Design (RCBD) due to their varying ages. The experimental native chickens were fed with commercial feeds *adlibitum* (T_0) and sweet potato leaves + commercial feeds (T_1)on a restricted time. Slaughtering was done after 82 days of feeding trial when the birds were about 16 to 20 weeks of age.

On all carcass parameters evaluated, statistical analysis showed no significant differences among the birds slaughtered. This signifies that the diet given did not affect the carcass yield of the native chickens.

INTRODUCTION

White meat such as chicken meat is considered superior in health aspects to red because of comparably low content of fat and cholesterol. Consumers also acknowledge the relatively low price, the typically convenient portions, and the lack of religious restriction against its consumption.

Poultry meat ranks quite higher than beef crops and red meat in conversion efficiency, inspite of the use of forage crops by beef cattle and sheep, goat for meat production. Poultry produce, eggs and meat, are cheaper sources of high quality proteinous food and are very much useful to fight malnutrition (Jadhav and Siddique, 2007).

Although native chicken grow at a slower rate and produce less number of eggs than commercial breeds, meat from them is more preferred by Filipinos because of its taste, leanness, pigmentation and sustainability for special dishes. In the Cordillera, native chicken along with the meat is very important in the people's culture.

Native chickens are generally considered tastier and healthier because they are usually raised in the backyards and they are not given medications such as antibiotics, which could have residual effect to consumers. This is why consumers are willing to pay for their higher price compared to commercial chicken.

This study would contribute reference materials on the use of sweet potato leaves and commercial feeds as ration for native chickens. Moreover, it hopes to promote the use of locally available green supplement in improving the carcass characteristics of native chickens.

Generally, this study was conducted to evaluate and compare carcass characteristics of native chickens given commercial feeds only and those given commercial feeds and sweet potato leaves.

Specifically, this study aimed to measure the carcass yield of native chickens in terms of dressed weight; dressing percentage; weight of major cuts and weight of other cuts; and analyze the nutrient composition of the carcass through proximate analysis.

This study was conducted at the Meat Laboratory of the Animal Science Department, BSU, La Trinidad, Benguet on January 2013.

REVIEW OF LITERATURE

Adding feed supplement to animals' diet is practiced to improve feed efficiency, animal appetite, and lessen production expenses. Francisco (1992) as cited by Lampacan (2004) stated that the reason why poultry and livestock farmers practiced the giving of feed supplement and other substances to the ration of the animal is to maximize productivity and improve carcass quality.

Poultry Meat Consumption

The per person consumption of poultry meat has increased significantly since 1987. A major increase in the per capita consumption of poultry meat began in the late 1970's as consumers became increasingly concerned about the level cholesterol in their diets. Poultry meat is perceived by the consumers as having a lower level of cholesterol than beef or pork (Gillespie, 1997).

According to Le Behan-Dval (2004), foods derived from animal products are important source of nutrients in the human diet and play an increasing role in the human nutrition in the future. In all aspects of animal products, poultry meat production growth, in particular chicken meat, has been very speedy over the last decades and up to now occupies second place in volume in the world just following pork, more and more concerns have been focused on poultry meat quality and its food safety.

Carcass Quality and Characteristics

Five main characteristics contribute to overall eating quality meat. These are the taste, texture, juiciness, appearance and odor. Among these characteristics, texture is probably considered to be the most attribute by the average consumer. Mechanical factors

(tenderness) and juiciness (succulence) contribute to different meat texture. The tenderness of meat is the sum total of the mechanical strength of skeletal muscle tissue and it's weakening during the post-mortem aging of meat. Meat tenderness originates in structural and biochemical properties of skeletal muscle fibers, especially myofibrils and intermediate filaments, and of the intramuscular connective tissue, the endomysium and perymesium, which composed of collagen fibrils and fibers. Attractive appearance to consumer of indigenous chicken meat is performed by its carcass conformation, skin or meat color which might be related to chicken genotypes, feeds, rearing system or even processing condition. There are many intrinsic and extrinsic factors including genotype or breed, age, rearing system, feeds chemical composition, structure, and properties of muscle and processing condition which can influence on different quality characteristics of chicken meat (Wattanachant, 2008)

Coma (2000) as cited by Bayacsan (2008) sated that today, people are nowhealth conscious and that they are particular on what they eat. As much as possible, the food should be free from any toxic substances or chemical residues which are hazardous to man. Because of the above reason, organically produced products, meat or vegetable is now becoming popular. Consumers are even willing to pay higher price for it. He also mentioned that nutrition may have significant effect on certain attributes of meat quality, but one should not forget its interrelation with other elements of production process like genetics, handling and slaughter.

Paris (1998) sated that a poultry carcass should produce high yield of meat of good nutritional value and eating quality. As commodity, it has to meet the requirements of the

consumer in terms of attractive color and appearance of the product offered. Also include the nutritive and the smell and especially free from chemical residues.

According to Sapling (2012), chicken meat is so far least expensive and this is probably the greatest reason why people prefer to buy. Also, it has a number of nutritional properties. Nutritionally, people eat chicken meat for its high-quality protein and its low fat content compared to red meats.

In 1992, Martin reported that visual traits of the carcass are of practical importance once they are the qualities that can be evaluated.

Gill (2000) stated that to produce a good quality of meat, it is best to use organic feeds which are formulated ration without using synthetic chemicals. Formulated ration such as organic feeds are more economical than commercial feeds. Organic chicken refers to animals reared in semi out-door conditions and feed diets without using chemicals. He also reported that the threshold for organic feed components rises to 80 % and it could become 100 % within five years. Even synthetic amino acids such as lysine and methionine will be questionable.

MATERIALS AND METHODS

Materials

The materials that were used in this study are 12 heads of native chickens with ages ranging from 16 weeks old to 20 weeks old. These were taken from a previous growth study with the following treatments:

T_0- commercial feeds

T_1- commercial feeds + sweet potato leaves

Each treatment had three blocks with four birds per block.

In the growth study, the birds in T_0 were given commercial feeds on *ad libitum* basis, while those in T_1 were given commercial feeds on a restricted time (6 am to 8 am; 4 pm to 6 pm) and sweet potato leaves *ad libitum* (9 am to 3 pm).

Slaughtering materials that were used are as follows: scalding vat, knives, chopping board, digital weighing scale, camera, containers, water, record book and ball pen.

Methods

Pre-slaughter preparation. A total of 12 bids were taken from the two treatments of the growth study. Two birds (one male + one female) represented each of the three blocks.

Before dressing, the birds were fasted for 12 hours but were provided with *ad libitum* water. All slaughtering materials used were thoroughly washed before using. Good hygienic practices were strictly followed during the slaughtering process. At least seven gallons of clean water was allotted for each bird to be slaughtered to ensure a thoroughly clean carcass.

Slaughtering of the birds. At the time of slaughtering, each bird was secured by a helper holding both shanks with one hand and both wings at its base with the other to prevent struggling. The bird was raised by approximately 45 degrees so that caudal part is higher than the head to accomplish complete bleeding. The bird was bled by cutting the throat just behind the lower mandible at the left side of the neck. Plucking or de-feathering was performed by immersing each bird in the scalding vat with hot water with a temperature ranging from 80-87^{0}C.

Carcass yield evaluation. First, the head, feet and neck were removed and weighed separately. Second, the internal organs and intestines were removed and also weighed separately. Internal organs include the heart, liver and gizzard. The intestines were weighed with ingesta. Next, the dressed carcass was weighed to get the dressed weight, and then fabricated into major cuts namely: breast, back, thigh and drumstick and weighed individually. After recording the weights, the lean, fat, and bone from the carcasses were separated to get the yield of each component.

Proximate analysis. Approximately 100 g of breast muscle was obtained from the carcasses per treatment and was brought to the Department of Science and Technology (DOST-CAR), La Trinidad, Benguet for moisture, crude fat, crude protein, ash, and energy content analysis.

Data Gathered

1. Slaughter weight (kg). This was obtained by weighing the fasted birds prior to slaughter using a digital weighing scale.

2. Dressed weight (kg). This was the weight of the slaughtered bird after plucking the feathers with the head, neck, feet and entrails off.

3. Weight of major cuts (kg). This was the individual weight of the major cuts after dressing and fabrication. Major cuts include the breast, back, wings, legs, and drumstick.

4. Weight of minor cuts (kg). This was the individual weight of the minor cuts after dressing and fabrication. Minor cuts include the head, neck and feet.

5.Weight of viscera (kg). This was the weight of the internal organs and intestines.

a. Weight of giblets (kg). This was the individual weight of the giblets after dressing and fabrication. Giblets include the liver, heart and gizzard.

b.Weight of the intestines (g). This was the weight of the small and large intestines with ingesta.

6. Weight of lean (g). This was the total weight of the lean obtained from the carcass.

7. Weight of bone (g). This was the total weight of bones obtained from the carcass.

8. Weight of skin (g). This was the total weight of the skin obtained from the carcass.

Data Computed

1.Dressing percentage. This was obtained by dividing the dressed weight by slaughter weight then multiplied by 100.

2. Percent major cuts. This was obtained by dividing the weight of breast, back, wings, and drumstick individually by the dressed weight then multiplied by 100.

3. Percent minor cuts. This was obtained by dividing the weight of head, feet and neck by the slaughter weight then multiplied by 100.

4 .Percent viscera. This was obtained by dividing the weight of viscera by the slaughter weight then multiplied by 100.

a. Percent of giblets. This was obtained by dividing the weight of liver, heart and gizzard by the slaughter weight then multiplied by 100.

b. Percent of intestines. This was obtained by dividing the weight of intestines with ingesta by the slaughter weight then multiplied by 100.

5. Bone yield (%). This was obtained by dividing the weight of bone by the dressed weight then multiplied by 100.

6. Lean yield (%). This was obtained by dividing the weight of lean by the dressed weight then multiplied by 100.

7. Skin yield (%). This was obtained by dividing the weight of skin by the dressed weight then multiplied by 100.

Statistical Analysis

All data were analyzed using the analysis of variance appropriate for Randomized Complete Block Design (RCBD). Means were compared using the Least Significant Difference (LSD) test.

RESULTS AND DISCUSSION

Slaughter Weight, Dressed Weight, and Dressing Percentage

Table 1 shows that the native chickens given commercial feeds (T_0) and those given commercial feeds + sweet potato leaves (T_1) had comparable slaughter weights (Figure 1) with a mean of 1.3433 kg and 1.2333 kg, respectively. After dressing (Figure 2), the weights of the carcasses produced from the two treatments were also statistically the same. Birds fed with commercial feeds had 0.8067 kg while birds fed with sweet potato + commercial feeds had 0.8294 kg. The dressing percentage computed from both treatments also produced comparable output of 59.94 % from birds fed with commercial feeds and 59.42 % from birds fed with sweet potato + commercial feeds. This signifies that the sweet potato leaves did not affect the slaughter weight, dressed weight, and dressing percentage of the native chickens.

On the other hand, statistical analysis shows that the blocks are significantly different from each other with block 2 having the highest mean of 1.7125 kg and block 3 having the lowest mean of 1.1562 kg. This significant difference is attributed to their differences on their final weights.

Table 1. Slaughter weight, dressed weight, and dressing percentage

TREATMENT	SLAUGHTER WEIGHT (kg)	DRESSSED WEIGHT (kg)	DRESSING PERCENTAGE (%)
Commercial feeds	1.3433	0.8067	59.94
Commercial feeds + sweet potato	1.2333	0.8294	59.42

Means with the no superscript are not significantly different ($P \geq 0.05$) LSD

Fgure 1. Slaughter weight of the native chickens at 16 to 20 weeks old

Figure 2. Weighing the birds for dressed weight

Weight of the Major Cuts

Major cuts include the breast, back, wings, drumstick and thigh (Figure 3). The weights of these cuts as well as the percent weights in proportion to the dressed weight are presented in Table 2. In all percentages of the major cuts, no significant difference was detected by LSD. This suggests that the sweet potato leaves did not have an effect on the weights of the major cuts.

Breast. Percent of breast is comparable among the birds fed with commercial feeds and sweet potato leaves + commercial feeds as shown by the mean percentages of 28.37% and 29.20 %, respectively. These values are within the range of the industry standard which is 28-30% (Acker, 2003).

Back. Percent of back from T_0 (23.33%) and T_1 (21.11%) is comparable to the industry standard which is 20-22% (back and neck).

Wings. The percentage of wings for birds fed with commercial feeds which is 13.66% and those birds fed with sweet potato + commercial feeds which is 13.50% is also within the range of the industry standard which is 12% to 14%.

Drumstick. Percentages of 16.90% and 25.70% from birds fed with commercial feeds and those birds fed with sweet potato + commercial feeds, respectively, are apparently higher than the industry standard of 14% -16%.

Thigh. The percentage thigh of birds fed with commercial feeds and birds fed sweet potato + commercial feeds was 17.87 % and 18.97 %, respectively. These values are higher compared to the 15% -17% industry standard (Acker, 2003).This would suggest that the native chickens had more developed thighs.

Table 2. Weights of the major cuts and as percent of the dressed weight

MAJOR CUTS	TREATMENTS			
	COMMERCIAL FEEDS		SWEET POTATO + CF	
	kg	%	kg	%
Breast	0.645	29.21	0.207	28.37
Back	0.140	25.33	0.125	21.12
Wings	0.108	12.12	0.100	13.66
Drumstick	0.140	17.13	0.125	16.90
Thigh	0.155	18.97	0.130	16.90

Means with no superscript are not significantly different by LSD.

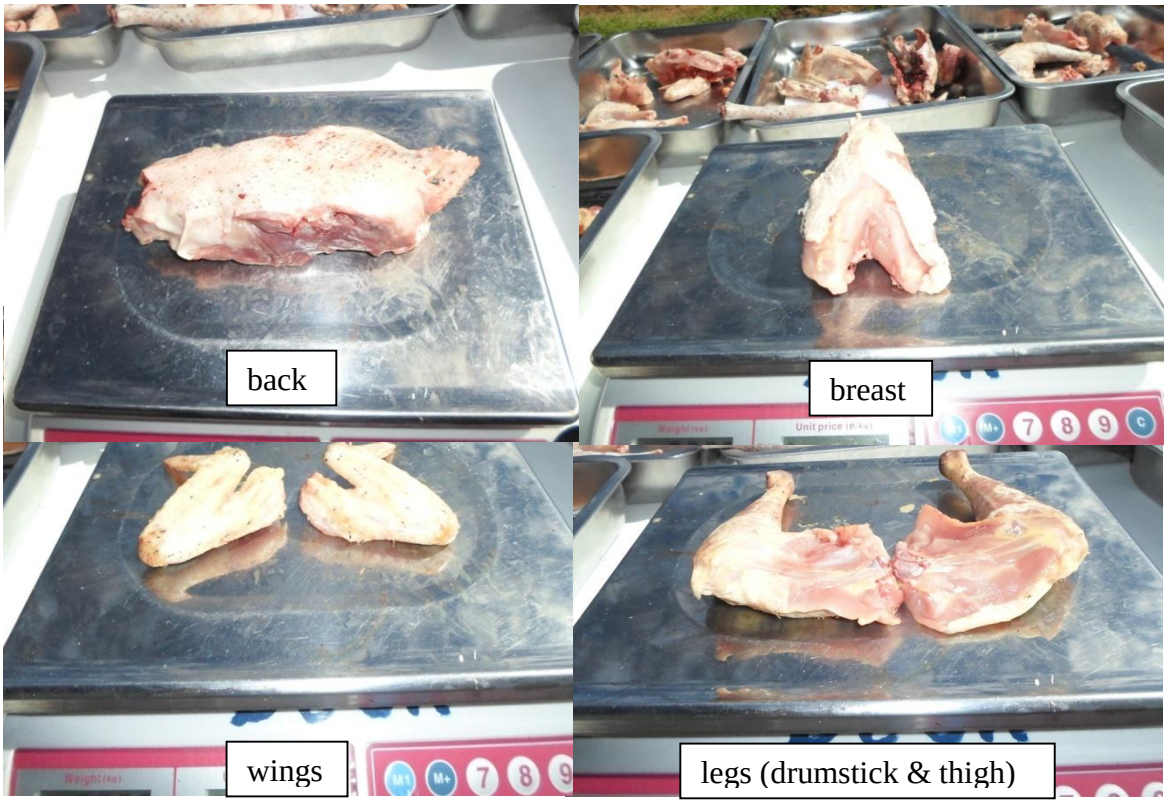

Figure 3. Weighing the major cuts

Weight of Minor Cuts

Table 3 presents the weight and percent of minor cuts as affected by the treatments. Minor cuts include the head, feet, and neck (Figure 4). Statistical analysis revealed that these cuts are comparable between the two treatments. Mean percentages of the head, feet, and neck for birds given commercial feeds are 5.56%, 5.16% and 10.24%, respectively. On the other hand, mean percentages of the head, feet, and neck for birds given commercial feeds and sweet potato are 5.37%, 6.09%, and 9.67%, respectively.

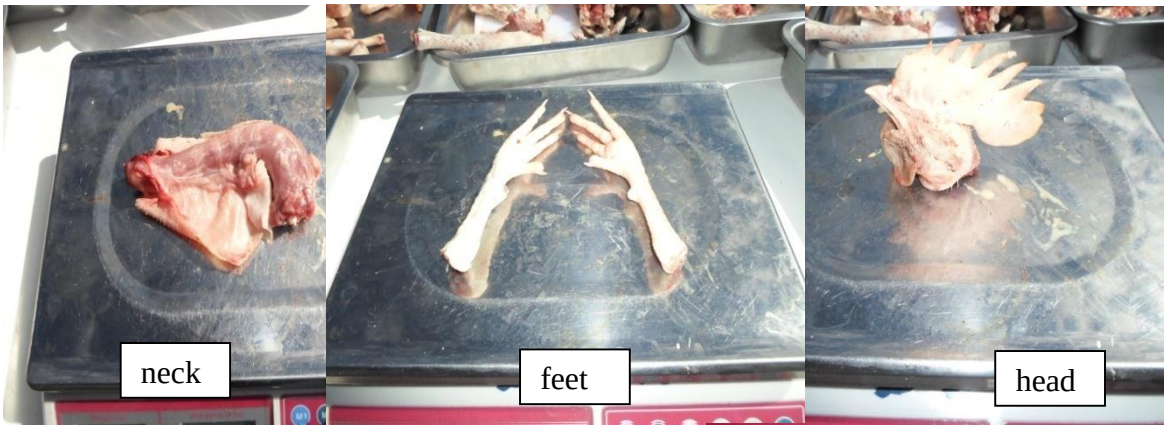

Figure Figure 4. Weighing the minor cuts

Table 3. Weights of minor cuts and as percent of the slaughter weight

MINOR CUTS	TREATMENTS			
	COMMERCIAL FEEDS		SWEET POTATO + CF	
	kg	%	kg	%
Head	0.0383	0.074	0.050	3.645
Neck	0.415	6.042	0.474	4.887
Feet	0.038	3.310	0.039	3.217

Means with no superscript are not significantly different by LSD

Weight of the Viscera

Table 4 presents the weight sand percent of the internal organs (heart, liver, and gizzard) and intestines as affected by the treatments (T_0- commercial feeds and T_1- sweet potato + commercial feeds). In T_0, the mean percentages of the heart, liver, and gizzard are 1.14%, 4.16%, and 4.21%, respectively. On the other hand, birds fed with sweet potato + commercial feeds had 1.06% for the heart, 3.94 for the liver, and 3.92% for the gizzard. There were no significant differences detected by LSD. This means that the diet given did not have an influence on the yield of the viscera.

Weight of Lean, Bone, and Skin

The weights of lean, bone and skin (Figure 5) as well as the percent weights in proportion to the carcass weight are presented in Table 5. In all percentages of the lean, bone and skin, no significant difference was detected by LSD. This suggests that the sweet potato leaves did not have an effect on the weights of these cuts.

The percent lean and bone for the control treatment is 73.06% and 19.54%, respectively and 70.44% and 20.97% for treatment 1. The figures for the percent lean are

Table 4. Weight of the viscera and as percent of the slaughter weight

VISCERA	TREATMENT			
	COMMERCIAL FEEDS		SWEET POTATO + CF	
	kg	%	kg	%
Liver	0.031	4.164	0.030	3.941
Heart	0.009	0.675	0.008	0.625
Gizzard	0.031	2.494	0.030	2.444
Intestines	0.049	4.045	0.049	3.877

Means with no superscript are not significantly different by LSD.

Figure 5. Weighing the skin, bone, and lean of the carcass

Table 5. Lean yield, bone yield, and skin yield (%)

YIELD	TREATMENTS			
	COMMERCIAL FEEDS		SWEET POTATO + CF	
	kg	%	kg	%
Lean	0.57073	0.06	0.535	70.44
Bone	0.166	19.54	0.143	20.97
Skin	0.068	7.40	0.054	8.33

Means with no superscript are not significantly different by LSD

very much higher compared to the lean yield of broilers which is only 40%. This proves the leanness of meat from native chickens. Figures for the percent bone which are 19.54% (T_0) and 20.97% (T_1) are also higher when compared to the bone yield of broilers which is 15%.

Proximate Analysis

Table 6 shows the proximate nutrient content of the carcasses. Breast muscle (100 g) from each treatment was taken and was subjected to laboratory examination at the DOST-CAR Regional Service and Testing Laboratory for proximate nutrient analysis. The breast was the part of the native chickens carcass selected because it is so far the most muscled part of the carcass.

Table 6. Result of proximate nutrient analysis*

TREATMENT	MOISTURE (%)	CRUDE FAT (%)	CRUDE PROTEIN (%)	ASH (%)	ENERGY (kcal)
Commercial feeds	72.83	0.21	25.14	1.31	104
Sweet potato leaves + CF	72.50	0.10	25.79	1.33	105

*Analysis was done at the DOST-CAR Laboratory

Moisture. As shown in Table 6, carcasses of birds in T_0- commercial feeds have higher moisture content of 72.83% compared to T_1-sweet potato + commercial feeds with 72.50%. These figures are lower compared to the moisture content of commercial chicken which is 75% (Arganosa, 1986 as cited by PCARRD, 2011). This is because the birds were about 16 weeks to 20 weeks when they slaughtered. Moisture content of meat decreases as animals mature.

Crude fat. Proximate analysis revealed that native chickens fed with commercial feeds have higher crude fat of 0.21 % compared to 0.10 % crude fat from those fed with sweet potato leaves. This difference, though very minimal, can be considered as an effect of the sweet potato leaves. These values are much lower than the 3.10% crude fat (Arganosa, 1986 as cited by PCARRD, 2011) from meat of commercial chicken.

Crude protein. Native chickens fed with sweet potato have higher crude protein of 25.79 % compared to native chickens fed with commercial feeds having 25.14 %. When these percentages are compared to the crude protein of broiler which is 20.60% (Arganosa, 1986 as cited by PCARRD, 2011), it can be proven that meat from native chickens are indeed better source of protein compared to its commercial counterpart.

Ash. Ash content indicates the amount of minerals present in the meat. Proximate analysis shows that native chickens fed with commercial feeds had 1.31 % which is more or less the same with that birds fed with experimental ration of 1.33 %. Ash content from commercial chicken is 1% (Arganosa, 1986 as cited by PCARRD, 2011). This implies that meat from the native chickens contain more minerals.

Energy. The energy contents of the native chickens under the different treatments are shown in Table 6. Results of proximate analysis revealed that the treatmentshad almost the same value of 104 kcal (T_0) and 105 kcal (T_1).

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

Summary

This study was conducted to evaluate the carcass characteristics of native chickens fed with commercial feeds and sweet potato leaves. Specifically, it aimed to determine the effect of the diet on carcass yield such as dressed weight; dressing percentage; weights and percentages of major cuts, minor cuts, viscera, lean, bone and skin. Also, it aimed to determine the nutrient composition of the carcass through proximate analysis.

Carcass evaluation was done by dressing two sample birds (one male + one female) taken from a growth study. Native chickens in T_0 were given commercial feeds *(adlibitum)* while T_1 was given commercial feeds and sweet potato leaves (restricted time). After 82 days of feeding trial, the birds weighed at least one kg at the time of slaughter.

In all measures evaluated, results have no significant difference which means that the diet given did not influence the carcass yield of the experimental birds.

Nevertheless, it is worth nothing that results of the proximate analysis shows an appreciable increase in the crude protein and ash content and reduced crude fat of the meat when fed with sweet potato leaves.

Conclusion

It is concluded that carcass yield was not improved by the diet given; however, the proximate nutrient composition was improved to some extent.

Recommendations

Based on the result of this study, giving commercial feeds and sweet potato leaves to native chickens on a restricted time can be adopted to produce more nutritious meat while maintaining the leanness of the carcass. Nowadays, these traits are the ones demanded by health conscious consumers.

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