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Full Length Research Article

# SENSORY EVALUATION AND MICROBIAL STATUS OF MEAT FLOSS FROM WEST AFRICAN DWARF GOATS FED GRADED LEVELS OF BROILER LITTER

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**ABSTRACT**
This study was conducted to evaluate the effects of dietary inclusion levels of Broiler Litter (BL) on meat quality of West Africa Dwarf (WAD) goats. Five complete diets were formulated using BL to replace 40 % composition of Cottonseed Cake (CSC) as dietary protein source at 0, 25, 50, 75 and 100 % levels, thus each level of replacement served as a treatment. Thirty WAD bucks with average weight of 10.57±0.42 kg were randomly allotted to five treatments in a randomized complete block design (RCBD). After feeding trials and digestibility studies, the bucks were humanly slaughtered and two kilograms of meat from uniform parts (hind leg and loin) of each buck were processed to Meat Floss (*Dambun nama*) and evaluated for proximate, sensory qualities and microbial status during storage for 60 days at room temperature. Twenty semi-trained panellists were used to evaluate the processed meat, using a five-point hedonic scale, Total Aerobic Plate Counts (TAPC) and Total Coliform Counts (TCC) was also determined. The result revealed that proximate nutrients composition of fresh Chevon was not significantly ($p>0.05$) different in all the treatments. The results of sensory parameters revealed that aroma, taste, colour, tenderness, juiciness and acceptability were significantly ($p<0.05$) affected by levels of BL inclusions. Similarly, there was also interaction ($p<0.05$) between levels of CSC replacement with broiler litter and time of storage of *Dambun nama* on sensory parameters. It was concluded that replacing up to 50 % of CSC with BL improved meat sensory qualities.

**Keywords:** West African Dwarf goats, Chevon, Sensory evaluation, Poultry litter, Microbial status

## INTRODUCTION

West African Dwarf (WAD) goats are predominant in the southern and eastern parts of Nigeria (Yakubu *et al*., 2011). The breed also stretch north-ward to southern parts of the guinea savannah, comprising; Federal Capital Territory (FCT), Benue, Nasarawa, Kaduna and Niger states of Nigeria (Chenyambuga *et al*., 2004). West African Dwarf goats have small body size; adult males weigh 20-25kg, while Does weigh 18-22kg (Rotimi & Egahi, 2017). The breed is resistant to trypanosomosis and adapted to high humid areas. It is highly demanded because of its high consumer preference (Chiejina *et al*., 2010).

Animal protein makes a valuable contribution to diets because of its high biological value, it is an excellent source of amino acids, vitamins and minerals (Wood, 2017). A daily intake of 100 g of meat can supply up to 50% of the recommended daily allowance for iron, zinc, selenium, vitamins $B_1$, $B_2$, $B_6$, $B_{12}$ and 100% of vitamin A (Biesalski and Nohr, 2009).

Meat floss, locally known as *Dambun nama* is a traditionally spiced, cooked, minced and fried meat product which is commonly processed from beef, chevon, mutton, poultry or camel meat. *Dambun-nama* is more relished in the Northern parts of Nigeria than other region. The product appears to have developed as a means of preserving meat in the absence of facilities for refrigerated storage by the early Fulani and Hausa herdsmen (Igene *et al*., 1990).

Meat products generally have high moisture content and nearly neutral pH hence prone to microbial contamination and oxidative rancidity leading to discolouration, off-flavour and slimness. It is necessary to minimize deterioration of meat in order to prolong the time during which acceptable levels of quality are maintained. Maintenance of meat quality depends upon the processing and preservative methods used, as well as the inherent properties of the meat in question (Forest *et al*., 2001).

There are many studies conducted on feeding ruminants with poultry litter. The studies revealed that inclusion of BL in ruminant diet-maintained body growth and decreased cost of feed and feed cost per kilogram gain (Muhammed *et al*., 2013). However, there is limited information on the effect of feeding poultry litter on sensory and microbial properties of animal products.

This study was designed to evaluate the effect of dietary inclusion of broiler litter on proximate composition, sensory properties and microbial status of meat floss processed from Chevon of West African Dwarf (WAD) goats stored for 90 days.

## MATERIALS AND METHODS

### Experimental Site

This study was conducted at the Teaching and Research Farm, Department of Animal Science, Kaduna State University (KASU), Kafanchan Campus. Kafanchan is located at latitude 9˚59'N and longitude 8˚29'E, it is also situated at an elevation of 733m above sea level (World Atlas, 2019). The laboratory analyses for samples obtained in this study were carried out at the Multipurpose Laboratory, Department of Biochemistry and also at Public Health Laboratory, Faculty of Veterinary Medicine and Biochemistry Laboratory Department of Animal Science all in Ahmadu Bello University (ABU) Zaria, Nigeria.

### Experimental Design, Materials and Management of Animals

Thirty (30) WAD bucks with average weight of 10.57±0.42 kg, were randomly allotted to five (5) treatments in a randomized complete block design (RCBD). Blocking was done on weight basis and a factorial design using non-parametric method was

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used to analyze the five (5) levels of broiler litter inclusion and three (3) storage periods used for the final product.

The bucks were individually housed and administered prophylactic treatment two weeks before commencement of trial.

Broiler litter (BL) was sourced from local poultry farms that used rice husk as bedding material in a deep litter system. The litter was processed manually by removing all foreign materials then stacked for about seven days before drying under shade. The Broiler litter was then used to replace 40 % composition of cottonseed cake in the diet at 0 (control), 25, 50, 75 and 100 % dietary replacement levels. The chemical composition of the experimental diets (total mixed ration) is presented in Table 2. The bucks were fed 3.5 % of their bodyweight once daily with their respective diet at 0800 hours, while water was provided *ad-libitum*.

**Slaughter and Processing of Meat Floss**

After the 90 days of fattening period and 21 days for digestibility studies, the bucks were fasted for 12 hours and the halal method of slaughtering was followed and conventional procedure of flaying was observed (Khan *et al*., 2018).

Two kilograms (2 kg) of Chevon from the hind leg and loin were obtained from each of the bucks. All external fats and visible connective tissues were trimmed off from meat surface. Meat floss was prepared according to procedure described by Eke *et al*. (2012).

**Sensory Evaluation**

Processed samples (Meat floss) were each cut into bite sizes and served in plates to a twenty-member semi-trained panellist. Aroma, taste, colour, tenderness, juiciness and acceptability were evaluated using a 5-point hedonic scale with a score of 5 indicating "extremely acceptable", 4 "very acceptable", 3 "acceptable", 2 "fairly acceptable", 1 "not acceptable". A score below 2 was considered not acceptable. The meat products were coded with numbers of 2 digits indicating no information about the samples to avoid bias in preferred treatments. The panellists received each sample separately, rinsing their mouth in-between samples.

**Microbial Analysis**

Total Aerobic Plate Count (TAPC) and Coliform Counts were conducted according to procedure of ISO (2001). 25g/225ml of 0.1% peptone water and 5g of sample were weighed out using aseptic technique, and homogenized in enrichment medium to obtain $10^{-1}$ dilution. The $10^{-1}$ bacterial suspension was serially diluted to $10^{-4}$. The serial dilution was extended in some samples with higher concentration of micro-organisms. A volume of 0.5 ml was pipetted onto the surfaces of two plates; Mac-Conkey for Coliforms and Nutrient agar for Total Aerobic Count and immediately spread out with a sterile glass spreader i.e. using a standard pour plate technique. The Total viable count was calculated from the average colony count/plate after incubation and interpreted using the standard microbial load specification on animal food product (Wilson & Sperber 1991) as a guide (Table 1).

**Table 1**: Standard Microbial Load Specification on Animal food Product.

| Grades | TVC (total viable count)/g at $30^0$C | Description |
|---|---|---|
| I | $\leq\frac{1}{2}$million | Satisfactory |
| II | $\frac{1}{2}$ million to < 10 million | Passable |
| III | 10 million and more | Unsatisfactory |

Source: Wilson *et al.,* (1991)

**Laboratory analysis**

Proximate composition of experimental diets fed to the animals and meat floss were determined according to Association of Official Analytical Chemists (AOAC, 1990) methods of analysis. Gross energy (GE) was measured using bomb calorimeter (Brand IKA; model C2000). Fibre fractions (Acid detergent fibre and Neutral detergent fibre) of the diets were determined using the Van Soest et al., (1991) method. Data collected on proximate and sensory evaluation were subjected to parametric and non-parametric test using general linear model (GLM) of Statistical Analysis System (SAS, 2011). Means were separated using Duncan Multiple Range Test (DMRT) (Duncan, 1955).

**RESULTS AND DISCUSSION**

**Table 2**: Chemical Analysis of Experimental Diets

| | Level of replacing CSC with BL (%) | | | | |
|---|---|---|---|---|---|
| Nutrient (%) | 0 | 25 | 50 | 75 | 100 |
| Dry matter | 90.3 | 90.02 | 90.21 | 90.04 | 90.03 |
| Organic matter | 89.62 | 87.34 | 86.04 | 85.79 | 84.62 |
| Ash | 10.38 | 12.66 | 13.96 | 14.21 | 15.38 |
| Neutral detergent fibre | 57.4 | 54.3 | 52.5 | 50.2 | 47.40 |
| Acid detergent fibre | 24.9 | 26.7 | 27.75 | 28.4 | 26.75 |
| Acid detergent lignin | 5.65 | 6.3 | 7.48 | 8.45 | 8.95 |
| Crude fibre | 16.67 | 15.33 | 14 | 11.33 | 10.00 |
| Hemi cellulose | 32.5 | 27.6 | 24.75 | 21.8 | 20.65 |
| Cellulose | 19.25 | 20.4 | 20.27 | 19.95 | 17.80 |
| Ether extract | 4.67 | 4.33 | 4.13 | 3.84 | 3.25 |
| Crude protein | 13.88 | 13.96 | 13.65 | 13.56 | 13.76 |
| Gross energy (MJ/kg DM) | 16.138 | 15.895 | 15.285 | 14.87 | 14.51 |

**Proximate Composition of Meat Floss**

The values recorded for proximate composition (Table 3) of Chevon from goat fed varying levels of broiler litter were statistically not significant ($p>0.05$). The values for crude protein (22.09-24.09 %) obtained in this study were slightly higher than the values reported by El-Shater *et al*. (2012) and Azan and Aminah (2015) who reported crude protein values of 21.3 % and 22.47 %, respectively. The mean value for ether extract from the five treatments was 2.48%, which is in agreement with earlier report by USDA (2018) who recorded similar value (2.80 %). Similarly, the chemical composition of meat floss recorded in this study is within acceptable range of 75 % moisture, 2.5% fat and 0.65% minerals reported for adult mammalian muscle (Lawrie, 1998). The differences in proximate composition of Chevon observed in the present and previous studies could be related to several unrelated factors such as breed, age, sex, weight, and nutritional history of an animal (Toplu *et al*., 2013). There was no observed relationship or trend between dietary inclusion levels of BL and the measured proximate parameters of Chevon across all

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samples, hence dietary replacement of cottonseed cake with broiler litter did not affect the chemical composition of meat from WAD bucks.

**Table 3**: Chemical Composition of Chevon from WAD Bucks fed Cottonseed Cake Diet Replaced with Broiler Litter (BL)

| | Level of Replacing CSC with BL (%) | | | | | | |
|---|---|---|---|---|---|---|---|
| Parameters (%) | 0 | 25 | 50 | 75 | 100 | SEM | P-value |
| Dry matter | 24.41 | 31.67 | 28.98 | 28.54 | 33.08 | 2.93 | 0.542 |
| Crude protein | 23.35 | 23.04 | 24.09 | 22.09 | 22.51 | 0.74 | 0.532 |
| Ether extract | 2.13 | 2.73 | 2.46 | 2.39 | 2.69 | 0.24 | 0.488 |
| Ash | 1.70 | 1.65 | 2.34 | 1.03 | 1.58 | 0.31 | 0.206 |
| NFE | 72.82 | 72.58 | 72.22 | 74.49 | 72.22 | 0.83 | 0.220 |

NFE= Nitrogen Free Extract *significant at 0.05

**Sensory Evaluation of Meat Floss**

The sensory evaluation (using Kruskal-Wallis test) of meat floss from WAD bucks fed graded levels of broiler litter diets is presented in Table 4. The results obtained from the test panellist on a 5-point hedonic scale shows significant ($p<0.0001$) difference across the treatments on all measured sensory parameters. It is important to note that all measured sensory parameters (Aroma, Taste, Colour, Tenderness, Juiciness and Overall acceptability) had mean values above 3.60 on a 5-point hedonic scale. This result is comparable to a report by Hadjipanayiotou *et al.*, (1993), who observed no harmful effect of eating meat from ruminants fed dietary inclusion of 33% dried poultry manure in Black Syria Mountain goats. Many factors influence quality of processed meat such as intrinsic properties of the animal, age at slaughter, feed, medication, sex and processing method adopted. The highest score for aroma (4.01), taste (4.21), colour (4.14), tenderness (4.04), juiciness (4.04) and overall acceptability (4.32) was recorded for meat floss from bucks fed 50 % replacement level of cottonseed cake with broiler litter. The relationship between the measured parameters and the overall acceptability agrees with the report by Omojola *et al.*, (2013) who observed that juiciness among other parameters is made up of two effects; the impression of moisture released during chewing and also the salivation produced by flavour factors. Gandi *et al*. (2016) similarly reported that meat juiciness plays an important role in conveying the overall impression of palatability to the consumer. Omojola (2008) also reported that tenderness is the most important trait in meat quality. Tenderness has been identified as an important and critical eating quality in Nigeria that determines whether consumers are repeated buyers or not (Gandi *et al*., 2016). The preference of panellists for meat floss from bucks fed 50% dietary replacement of CSC with BL could also be associated with fatty acid profile of the meat as influenced by the dietary inclusion level of broiler litter. There was generally no observed trend between dietary inclusion levels of broiler litter and the sensory parameters of the meat floss.

**Table 4**: Dietary Broiler Litter Level Effect on Sensory Attributes of Meat Floss from West African Dwarf Bucks fed Cottonseed Cake diet Replaced with Broiler Litter(BL)

| | Replacement Levels of CSC with BL | | | | | |
|---|---|---|---|---|---|---|
| Variable | 0% | 25% | 50% | 75% | 100% | p-value |
| Aroma | $3.80\pm0.05^{b}$ | $3.43\pm0.05^{d}$ | $4.01\pm0.05^{a}$ | $3.65\pm0.05^{c}$ | $3.80\pm0.05^{b}$ | <.0001 |
| Taste | $3.92\pm0.06^{b}$ | $3.19\pm0.05^{d}$ | $4.21\pm0.06^{a}$ | $3.74\pm0.06^{c}$ | $3.82\pm0.05^{bc}$ | <.0001 |
| Colour | $4.12\pm0.05^{a}$ | $3.83\pm0.06^{b}$ | $4.14\pm0.06^{a}$ | $3.78\pm0.06^{b}$ | $3.81\pm0.06^{b}$ | <.0001 |
| Tenderness | $4.02\pm0.05^{a}$ | $3.47\pm0.05^{c}$ | $4.04\pm0.06^{a}$ | $3.71\pm0.06^{b}$ | $3.97\pm0.05^{a}$ | <.0001 |
| Juiciness | $3.86\pm0.05^{b}$ | 3.22±0.05d | 4.04±0.06a | 3.69±0.06c | 3.94±0.06ab | <.0001 |
| Acceptability | $4.15\pm0.05^{b}$ | $3.43\pm0.04^{d}$ | $4.32\pm0.05^{a}$ | $3.82\pm0.06^{c}$ | $4.02\pm0.05^{b}$ | <.0001 |

$^{abcd}$ Means with different superscript

**Interaction between Storage Days and Meat Sensory Parameters:**

Table 5 shows the factorial analysis to compare effect of interaction between levels of dietary treatments and storage periods, the panellists were able to detect differences ($p<0.0001$) on sensory parameters over time and across treatment groups.

Hence it was deduced that there was significant interaction ($p<0.05$) between levels of broiler litter inclusion and storage periods. It was observed that sensory parameters of meat floss were better appreciated by panellist at 30 and 60 Days than at Day 1. Similarly, sensory parameters at day 30 seemed better than at day 60. However, there was no clear trend of treatment effects on sensory parameters over period of storage.The significant interaction between sensory parameters and storage periods could be attributed to the improvement of free amino acids and oligopeptides content of the chevon, this also agrees with report by Nishimura *et al*., (1988) who reported that most inherent flavor properties in meat develop over time. It may also be attributed to many enzymatic and non-enzymatic reactions which can occur during storage, giving rise to volatile compounds such as aldehydes, carboxylic acid, alcohols, ketones, esters, sulphur compounds, alkanes, alkenes, terpenes, nitrogenous compounds, aromatic and cyclic hydrocarbons which may be responsible for generation of volatiles such as protein degradation, lipid degradation and oxidation, mallards reaction and striker degradation of amino acids (Huan *et al*., 2005). These compounds are known to contribute to the flavour development in meat products (Olaoye, 2015).

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**Table 5**: Effect of Storage Days on Meat Sensory Parameters of Meat Floss from West African Dwarf Bucks fed Cottonseed Cake diet Replaced with Broiler Litter(BL)

| | | Storage Days | | | | |
|---|---|---|---|---|---|---|
| Parameter | Inclusion BL% | 0 | 30 | 60 | SEM | I*Day |
| Aroma | 0 | 3.77 | 3.80 | 3.83 | 0.08 | 0.8785 |
| | 25 | 3.44 | 3.59 | 3.30 | 0.09 | 0.0835 |
| | 50 | 4.09 | 4.00 | 3.91 | 0.09 | 0.3357 |
| | 75 | 3.45$^{b}$ | 3.83$^{a}$ | 3.70$^{a}$ | 0.08 | 0.0071 |
| | 100 | 3.80 | 3.88 | 3.74 | 0.08 | 0.5145 |
| Taste | 0 | 3.65$^{b}$ | 3.98$^{a}$ | 4.11$^{a}$ | 0.10 | 0.0035 |
| | 25 | 3.29 | 3.12 | 3.18 | 0.08 | 0.3807 |
| | 50 | 4.21 | 4.29 | 4.14 | 0.09 | 0.5005 |
| | 75 | 3.45$^{b}$ | 3.91$^{a}$ | 3.91 | 0.10 | 0.0011 |
| | 100 | 3.80 | 3.86 | 3.83 | 0.09 | 0.9011 |
| Colour | 0 | 3.98 | 4.18 | 4.18 | 0.09 | 0.1876 |
| | 25 | 3.61$^{b}$ | 3.91$^{a}$ | 3.95$^{a}$ | 0.10 | 0.0306 |
| | 50 | 4.08 | 4.26 | 4.09 | 0.10 | 0.3338 |
| | 75 | 3.42$^{b}$ | 3.93$^{a}$ | 4.00$^{a}$ | 0.10 | 0.0001 |
| | 100 | 3.71 | 3.91 | 3.79 | 0.11 | 0.4155 |
| Tender | 0 | 3.82$^{b}$ | 4.12$^{a}$ | 4.11$^{a}$ | 0.09 | 0.0281 |
| | 25 | 3.30$^{b}$ | 3.62$^{a}$ | 3.53$^{ab}$ | 0.09 | 0.0403 |
| | 50 | 3.92$^{b}$ | 4.21$^{a}$ | 3.97$^{ab}$ | 0.10 | 0.0353 |
| | 75 | 3.48$^{b}$ | 3.80$^{a}$ | 3.86$^{a}$ | 0.09 | 0.0099 |
| | 100 | 3.85$^{b}$ | 4.15$^{a}$ | 3.94$^{ab}$ | 0.09 | 0.0395 |
| Juiciness | 0 | 3.76 | 3.86 | 3.97 | 0.09 | 0.2505 |
| | 25 | 3.18 | 3.33 | 3.20 | 0.09 | 0.4473 |
| | 50 | 3.89 | 4.20 | 4.03 | 0.09 | 0.0745 |
| | 75 | 3.35$^{b}$ | 4.20$^{a}$ | 4.03$^{ab}$ | 0.09 | <.0001 |
| | 100 | 3.73$^{b}$ | 4.17$^{a}$ | 3.94$^{ab}$ | 0.09 | 0.0024 |
| Acceptability | 0 | 3.9$^{b}$ | 4.22$^{a}$ | 4.3$^{a}$ | 0.08 | 0.0021 |
| | 25 | 3.33 | 3.47 | 3.50 | 0.08 | 0.3017 |
| | 50 | 4.27 | 4.38 | 4.26 | 0.09 | 0.5454 |
| | 75 | 3.42$^{b}$ | 3.90$^{a}$ | 4.09$^{a}$ | 0.09 | <.0001 |
| | 100 | 4.00 | 4.03 | 4.00 | 0.10 | 0.9610 |

Abc Means with different superscript. I=Inclusion levels

**Total Aerobic Plate Count of Meat Floss**

The result for Total Aerobic Plate Count (TAPC) of meat floss from WAD bucks fed dietary levels of broiler litter over a storage period of 90 Days is shown in Figure 1. Meat floss from bucks fed 0 % BL (Sample 1) had mean values of 1, 2, 6 and 7 ($10^{8}$cfu/g) for Day 1, 30, 60 and 90 of storage respectively. Sample 2 (meat floss from bucks fed 25 % BL replacement) had values of 2, 3, 7 and 7 ($10^{8}$cfu/g) for Day 1, 30, 60 and 90 of storage respectively. The highest TAPC value was recorded in sample 3 (Meat floss from bucks fed 50% BL replacement with CSC) which had mean values of 9 × $10^{8}$ (cfu/g) at Day 90, Day 1, 30 and 60 had values of 0, 2 and 3 ($10^{8}$cfu/g) respectively. The lower TAPC mean values were found in Sample 4 which had 2, 3, 5 and 6 ($10^{8}$cfu/g) for Day 1, 30, 60 and 90 of storage. Meat floss from bucks fed 100 % dietary replacement of CSC with BL (Sample 5) had the lowest mean value with 4 × $10^{8}$cfu/g in Day 90 of storage. The results for TAPC of Meat floss from WAD bucks fed dietary replacement of CSC with BL are all within control and satisfactory limits (Wilson *et al*., 1991). The reason for low TAPC in meat samples from the treatment diets could be associated to the activity of free fatty acids which inhibit growth of bacteria (Andrew and Valerie, 2010), and it may be as a result of several other factors such as low moisture content, hygienic conditions during processing and low water holding capacity (water activity of samples), which might have aided in preserving the products (Gandi *et al*., 2018). Total aerobic plate counts as observed in this study are comparable to values (of 7.12 × $10^{6}$ cfu) reported by Fahim *et al*. (2018) on total bacteria counts of meat product. Dipak *et al*. (2019) also reported similar values of 2.46, 2.25 and 2.04 ($\log_{10}$ cfu) for day 0, 30, and 60 respectively on chicken nuggets stored at -18±$2^{0}$c, the decline in TAPC value recorded over time by Dipak*et al*. (2019) may be due to the lower storage temperature and packaging material used. There was no observed trend in aerobic plate counts across the samples in this study; hence, Meat floss produced from WAD goats fed dietary levels of broiler litter at levels up to 40 % had no negative influence on the microbial status (TAPC).

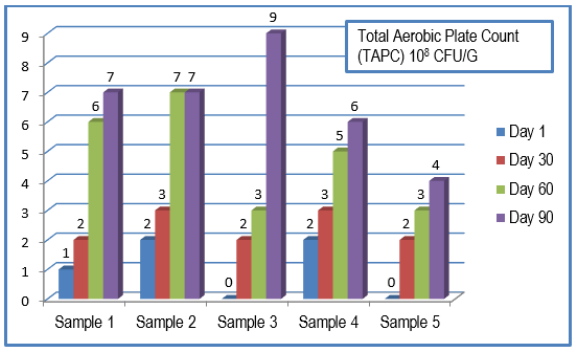


**Figure 1**: Total Aerobic Plate Count of Meat Floss from WAD bucks fed dietary levels of cottonseed cake replaced with broiler litter

**Total Coli-form Counts of Meat Floss**

Total Coli-form counts of Meat Floss from WAD goats fed dietary levels of BL (Table 6) fell within satisfactory limit with reference to standard microbial load specification (Wilson *et al*., 1991). There was no coli-form count across all samples at Day 1 and Day 30 of storage. The highest value was recorded in Meat floss from bucks fed 50 % replacement of CSC with BL (T3) which had 3 × $10^{5}$and 7 × $10^{5}$(cfu) for Day 60 and 90 respectively. The results for Coliform units across the five treatment samples during the 90-day storage period agrees with report by Dipak *et al*.(2019), who did not detect coliforms and yeast in meat product (nugget) stored for 3 months (90 days). The Coliform units were not detected in significant quantities throughout the storage period. It could be due to the destruction of Coliforms during cooking at high temperatures above 57°C. Further, hygienic practices followed during handling and packaging of Meat Floss could also be one of the reasons for the absence of coliforms. It might also be due to unfavourable conditions for their growth such as low pH and good hygienic practices followed during the product preparation (Gandi *et al*., 2018).Similar results were reported by Sachdev and Gopal (2000) in cooked chicken rolls and pork patties (Kumar and Sharma, 2004). There was also no observed trend between treatments groups and Coliform units detected in this study; hence, meat floss produced from WAD goats fed dietary levels of broiler litter at 40 % composition level had no negative influence

on the microbial status (TAPC) of the final product.

**Table 6**: Total Coliform Count (TCC) of Meat Floss from WAD Bucks fed Dietary Levels of Cottonseed Cake Replaced with Broiler Litter

| | | Storage Days | | | |
|---|---|---|---|---|---|
| Treatment | Analytical test ($10^5$cfu) | Day 1 | Day 30 | Day 60 | Day 90 |
| T 1 | TCC | ND | $0 \times 10^5$ | $1 \times 10^5$ | $2 \times 10^5$ |
| T 2 | TCC | ND | $0 \times 10^5$ | $2 \times 10^5$ | $3 \times 10^5$ |
| T 3 | TCC | ND | $0 \times 10^5$ | $3 \times 10^5$ | $7 \times 10^5$ |
| T 4 | TCC | ND | $0 \times 10^5$ | $1 \times 10^5$ | $2 \times 10^5$ |
| T 5 | TCC | ND | $0 \times 10^5$ | $1 \times 10^5$ | $2 \times 10^5$ |

TCC: Total Coliform Count, ND: Not detected

**Conclusion**

From the results obtained, the following conclusions are made:

- Dietary inclusion of broiler litter up to 40 % in the diet of West African Dwarf (WAD) goat did not affect the chemical composition of meat (chevon)
- Cottonseed cake replaced with broiler litter at 50 % in diets of WAD goats has better sensory attributes and eating quality.
- Microbial load of meat floss stored for 90 days at room temperature produced from Chevon of WAD goats fed dietary levels of broiler litter were within safe limit. Thus, the nutrients, minerals, vitamins and antibiotics, microbial contaminants as well as drug residues present in broiler litter were not transferred to or influence the final product (Meat Floss).

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