

PROXIMATE COMPOSITION AND ORGANOLEPTIC PROPERTIES OF GOATS FED WITH CORN COBS AND CASSAVA PEELS AT DIFFERENT TIERS

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Abstract

The study aims to determine the proximate composition and organoleptic qualities of Goats that were provided with varying quantities of corn cobs and cassava peels as fodder. Sixteen (16) growing bucks were acquired from various sources and thereafter confined prior to their collective raising for acclimation. Each animal was weighed separately and assigned to one of the sixteen (16) rearing units, comprising four (4) treatments and four (4) repetitions, with one (1) animal per replicate, ensuring weight equalization. At the conclusion of the 24-week experiment, two animals from each treatment group were chosen for carcass analysis. Before slaughter, the animals were deprived of food for 12 hours to ensure an empty stomach and prevent fecal contamination during evisceration. The organoleptic assessment of the fried goat flesh indicated that the color of T1 was markedly distinct from the other treatments (T2-T4). The tenderness of T1 and T2 was considerably different ($P < 0.05$) from T3 and T4. The juiciness of T1, T2, and T4 was considerably ($P < 0.05$) different from that of T1, T2, and T3 in terms of flavor. The general acceptance was not substantially different ($P > 0.05$) from one another. The proximate study of the fried goat flesh indicated no differences in the proximate parameters among all treatments (T1-T4). They were not statistically significant ($P > 0.05$).

Keywords: Goats, Corn cobs, Cassava peels, proximate analysis, organoleptic properties.

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Introduction

Livestock, including goats, play an important role in food security, poverty reduction, and wealth creation in West Africa (Baldomero *et al.*, 2020). In rural communities of Southwest Nigeria, cassava processors are aware of the potential for utilizing cassava peel, a waste product, but more needs to be done to promote its utilization (Odediran *et al.*, 2015). Sustainable poultry production practices,

including the use of renewable energy sources and sustainable biobased composites, can also contribute to poverty alleviation in rural areas of Nigeria (Nwobodo *et al.*, 2023). Utilizing corn cob and cassava peel to feed goats at different levels is a waste-to-wealth initiative that has the potential to improve the livelihoods of rural communities in Nigeria. Cassava peel and corn cob are waste products that are readily available in rural communities,

making them a cost-effective feed source for goat rearing (Olowoyeye *et al.*, 2019). The potential of cassava peel for feeding goats in Nigeria has been recognized, and it has been found to have great potential for goat feeding (Olowoyeye *et al.*, 2019). Cassava peel and corn cob are rich in nutrients, including carbohydrates, fiber, and minerals, Fasae and Yusuf (2022). This makes them a nutritious feed source for goats, which can help improve their growth and productivity.

Studies have shown that cassava peel and corn cob can be used successfully as an adequate source of much-needed protein and energy for smallholder goat production, Fasae and Yusuf (2022). Cassava peel in fresh or dried form also provides complementary energy to cattle, sheep, and goats in traditional systems FAO (2023). Utilizing cassava peel and corn cob for goat feed can help reduce waste and promote sustainable waste management practices in rural communities FAO (2023). This can mitigate the environmental impact of waste and foster ecological sustainability. The use of corn cob and cassava peel as goat feed at varying amounts represents a waste-to-wealth project capable of enhancing the livelihoods of rural communities in Nigeria. Cassava peel and maize cob serve as economical and nutritious feed alternatives for goats, enhancing their growth and productivity. This effort will advance sustainable livestock production practices and aid in poverty alleviation in rural Nigeria. This study seeks to investigate Waste-to-Wealth Feeding by assessing the feasibility of utilizing corn cobs and cassava peels as goat feed, evaluating goat health status, and determining the meat quality and sensory characteristics of

chevon from goats fed varying levels of corn cobs and cassava peels.

Materials and methods

The research was conducted in the experimental facility of the Department of Animal Health and Production, Oyo State College of Agriculture and Technology, located in Igboora, Oyo State.

Management of experimental animals

Sixteen (16) developing bucks were acquired from various sources and subsequently confined prior to their collective acclimation. The animals were weighed individually and assigned to sixteen (16) rearing units, comprising four (4) treatments and four (4) replicates, with one (1) animal per replicate for weight equalization.

Analysis of carcasses

At the conclusion of the 24-week experiment, two animals from each treatment group were chosen for carcass analysis. Before slaughter, the animals were deprived of food for 12 hours to ensure an empty stomach and prevent fecal contamination during evisceration.

Assessment of organoleptic properties

Twenty semi-trained persons were employed to evaluate the meat samples. The samples were assessed for scent, flavor, color, juiciness, tenderness, and general acceptance. The samples were evaluated using a nine-point hedonic scale, with the highest score indicating an exceptionally favorable state and the lowest score denoting the least favorable condition (Mahendraker *et al.*, 1988). Uniform bite sizes from all treatments were standardized and presented. Each sample was assessed independently of the others.

Table 1: Composition (%) of the goat diet

Treatments					
Ingredients	T1 (0%)	T2 (33.65% Cassava Peel 66.35% Cobs)	T3 (66.35% Corn Cobs 33.65% Peel)	T4 (50% Cassava Peel 50% Corn Cobs)	
Corn bran	50.00	39.45	39.45	39.45	
SBM	5.00	5.00	5.00	5.00	
PKC	13.00	13.00	13.00	13.00	
W.O	28.00	28.00	28.00	28.00	
Cassava Peel	-	3.55	7.00	5.28	
Corn Cobs	-	7.00	3.55	5.28	
Bone meal	3.50	3.50	3.50	3.50	
Salt	0.50	0.50	0.50	0.50	
CP (%)	14.98	14.06	14.15	14.10	
M.E (kcal/kg)	2539.68	2285.84	2337.86	2311.85	

SBM Soya Bean Meal
PKC. Palm Kernel Cake
WO. Wheat Offal

Table 2: Proximate composition (%) of the Cassava peel used

Moisture content	8.72
Crude protein	4.75
Crude fibre	8.69
Ether extract	2.22
Ash	8.79
Nitrogen free extract	66.77

	99.94

Table 3: Proximate composition (%) of the Corn cobs used

Cellulose	40.22
Hemicellulose	36.01
Lignin	10.27
Ash	1.79
Ether extract	0.72
Crude protein	0.84
Carbon	10.35

	100.20

Table 4: Sensory properties of fried goat meat fed corn cobs and cassava peels

Treatments				
Parameters	T1	T2	T3	T4
Colour	7.30 ^b ±0.35	8.46 ^a ±0.29	8.38 ^a ±0.26	8.55 ^a ±0.32
Tenderness	6.10 ^a ±0.34	8.70 ^a ±0.24	7.80 ^{ab} ±0.31	7.41 ^b ±0.42
Juiciness	6.20 ^a ±0.44	8.69 ^a ±0.26	7.53 ^b ±0.34	8.70 ^a ±0.34
Flavour	7.20 ^b ±0.28	7.20 ^b ±0.34	7.07 ^b ±0.32	8.17 ^a ±0.23
Overall acceptability	3.19±0.32	2.64±0.25	3.18±0.30	2.70±0.35

Table 5: Proximate evaluation of fried goat meat fed grain levels corn cobs and cassava peels

Parameters	T1	T2	T3	T4	SEM	P.value
M.C	73.10	72.80	72.10	73.03	0.48	0.91
E.E	3.02	3.16	3.08	3.08	0.06	0.93
C.P	22.70	23.01	22.89	22.94	0.14	0.92
C.F	0.56 ^a	0.40 ^b	0.51 ^a	0.49 ^{ab}	0.22	0.04
Ash	1.09	1.10	1.05	0.99	0.26	0.49

^{ab} means in the same row with different superscripts are significantly different (P<0.05)

M.C = Moisture Content, E.E = Ether Extract, C.P = Crude Protein, Crude Fibre, Ash

Results

The organoleptic assessment of the fried chevon in Table 4 indicated that the color of T1 was markedly distinct from the other treatments (T2-T4). The tenderness of T1 and T2 was substantially different (P<0.05) from that of T3 and T4. The juiciness of T1, T2, and T4 exhibited significant differences (P < 0.05) in flavor compared to T1, T2, and T3. The general acceptance was not substantially different from one another (P>0.05). The proximal analysis of the fried chevon presented in Table 5 indicated no differences in the proximate parameters among all treatments (T1-T4). They were not statistically different from one another (P>0.05), except for the crude fiber, which was considerably different (P<0.05).

Discussion

The sensory evaluation indicated that most parameters were significantly (P>0.05) different from one another. The elevated color was documented in treatment 4. Swan (1993) demonstrated that color intensity is contingent upon the absorption or scattering of incident light, typically regulated by meat pH. The

color of meat is regarded as a significant factor that influences clients' purchasing decisions in the market. Adams et al. (2010). Treatment 4 had the best juiciness ratings due to the post-mortem meat metamorphosis (Omojola et al., 2003). Juiciness has two effects: the perception of moisture released during consumption and the salivation induced by the flavor component (Omojola et al., 2003). The juiciness correlates directly with the intramuscular fat and moisture levels in the meat (Cross et al., 1986).

The tenderness of T2 exceeded that of the others. Tenderness is recognized as the most significant sensory feature influencing meat acceptance (Quali, 1990). The peak flavor was documented in T4. The flavor of meat comprises taste and scent components (Warris, 2000).

Treatments 1 and 3 were more favorably received than treatments 2 and 4; however, all were deemed acceptable based on the evaluated parameters.

The results from the proximate analysis indicated no significant differences among the treatments. This outcome contradicted the findings of Timketa Dagne et al. (2021), who

observed substantial differences among all parameters tested for beef Arsi. The elevated crude protein levels may result from the interaction of protein molecules (actin and myosin) in meat, leading to the formation of the actinomyosin complex and an increase in myofibrillar proteins, which are obscured by denatured sarcoplasmic protein. The results obtained align with those of Puolanne and Halinen (2010), who showed an increase in meat protein content due to elevated myofibrillar protein resulting from denatured sarcoplasmic protein. The elevated moisture content may result from the typical moisture level in goat meat, which often ranges from 74% to 76%. When goat meat is fried, some moisture evaporates; nevertheless, it may also become retained within the meat, particularly if the frying temperature is insufficiently high.

Conclusion

In conclusion, providing goats with varying amounts of corn cobs and cassava peels is highly advantageous, as it decreases feeding expenses and promotes animal growth, while also improving the meat's palatability. It is advisable for ruminant producers to feed goats with corn cobs and cassava peels at different levels.

Conflict of Interest

The author declares no conflict of interest.

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