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PROXIMATE COMPOSITION AND COEFFICIENT OF PREFERENCE FOR ENSILED GUINEA GRASS-CASSAVA PEEL MIXTURE WITH DIFFERENT PROPORTIONS OF CENTRO AND DELONIXSEED MEAL

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ABSTRACT

Proximate composition and coefficient preference for ensiled guinea grass-cassava peel mixture with different proportions of Centrosema pubescens and Delonix regia seed meal was studied.Guinea grass (GGR) was harvested at 4-weeks regrowth, Centrosema pubescens (CEP) before flowering, wilted chopped to 2-3 cm separately, cassava peel (CAP), Delonix regia seeds are processed to Delonix regia seed meal (DSM), mixed at different proportions (%) to have five (5) experimental treatments: T1 = 100% GGR; T2 = 80% GGR + 10% CAP + 10% CEP; T3= 80% GGR + 10% CAP + 10% DSM; T4 = 70% GGR + 10% CAP + 15% CEP + 5% DSM; T5 = 70% GGR + 10%CAP + 5% CEP + 15% DSM. Twenty five (25) litters paint rubber were used as silos with three replicates in completely randomize design (CRD) and ensiled for 30 days. The CP and NFE significantly (P<0.05) increases, while the CF, decreases (P<0.05) with increasing levels of CEP and DSM in the silage. The coefficient of preference (CoP) was higher (1.24) in T5 compared to other treatments. The preference ranking is 1st–T5, 2nd–T4, 3rd–T3, 4th–T2 and 5th–T1. Conclusively, inclusion of CEP and DSM enhanced the nutrients and CoP of the silage. The T5(70% GGR + 10% CAP + 5% CEP + 15% DSM) is recommended for ruminant famers for dry season feeding.

Keywords: Proximate-composition, Coefficient preference, Centro, *Panicum maximum*, Silage

INTRODUCTION

Forages such as grasses and legumes are the main source of feed for ruminants to meet their nutritional requirements, either for maintenance or production. Ruminant livestock in most parts of the tropics graze intensively on naturally growing forages. Nigerian ruminant industry is facing the problem of forage scarcity with high cost of feeds precipitated by inadequate supply of feed ingredients. This constraint has affected ruminant animal production negatively and created a wide gap between the demand and supply of animal protein in Nigeria (Lamidi and Akhigbe, 2018).

Meanwhile, dry season has been reported to be a serious threat to sustainable ruminant production (Lamidi and Ologbose, 2014) and peaceful coexistence of pastoral nomads and host community which also treating the national security and sub-regional security (Lamidi *et al*., 2021).

Excess forages available during the wet season can therefore, be conserved as silage, which is the traditional way of preserving grass and other crop plants, this enables animals to be fed during the dry season when vegetation is relatively scarce (Paul, 1999).

Silages made from tropical grasses alone are poor in nutrient because of the low protein content, suggesting a rich protein source as additive (Lamidi and Ingweye, 2020). Ojo *et al*. (2017) enhanced *Pennisetumpurpureum* silage with processed *Enterolobiumcyclocarpum*, Lamidi and Ojo (2018) used *Delonix regia* seeds andlegume forage such as *Centrosema molle* by Okunkenu *et al*. (2015). This study investigated the effect of inclusion levels of different proportions of *Centrosema pubescens* and *Delonix regia* seed meal onproximate composition and coefficient preference of ensiled guinea grass-cassava peel mixture.

MATERIALS AND METHODS

Location of the study

The study was carried out at the Forage Science laboratory, Department of Animal Science, Faculty of Agriculture, University of Port Harcourt, Rivers State, Nigeria. Port Harcourt is a coastal city located in the Niger Delta region of Nigeria within latitudes 6° 58' – 7° 60'E and longitudes 4° 40' – 4°55'N.

Sources and preparation of experimental materials and experimental treatments

Panicum maximum was harvested at four (4) weeks regrowth from the University community, at 10 cm above ground level.*Centrosema pubescens*was also harvested within the University of Port Harcourt community, Port Harcourt, Rivers State, Nigeria. The two forages were wilted for 24 hours and chopped with forage chopper machine into 2 – 3 cm long pieces. *Delonix regia* seeds were harvested and processed according to procedure of Lamidi and Evien (2019). The guinea grass, cassava peel, *Centrosema pubescens* and *Delonix regia* seed meal were then mixed at different proportions as shown in Table 1:

Table 1: Composition (%) of the experimental treatments

	Experimental materials			
Treatments	Guinea grass	Cassava peel	Centrosema	Delonix seed meal
T1	100	-	-	-
T2	80	10	10	-
T3	80	10	-	10
T4	70	10	15	5
T5	70	10	5	15

T = Treatment

Bamma bottles (960ml) were used as laboratory silos after the experimental materials were mixed thoroughly and ensiled; the bottles were tightly tied and covered to avoid air penetration. Each treatment had three replicates and the ensiled materials were kept at room temperature of 28 to 32°C for 30 days.

Sub-samples of the silage(s) were oven-dried. Dried samples were ground with a Thomas Willey Laboratory Mill-Model 4 and passed through 1-mm sieve, kept for laboratory analysis.

Chemical analysis

The proximate composition of the silage was determined according to the procedure of AOAC (2000). Non-fibre carbohydrate was calculated as NFE (%) = 100% – (CP% + Ash% + EE% + CF%).

Coefficient preference trial

Five (5) healthy West African Dwarf goats aged 12 – 24 mouths and weighing between 7 and 12 kg were used to determine the coefficient of preference (CoP) of the silages in a cafeteria technique for seven days. 1kg each of the silages was served daily in five different feeding troughs to the animals.Location of silages within the pen was interchanged daily to prevent association of diets with a particular location. The amount consumed was monitored for four hours per day and quantity consumed was recorded. After then the animals were released to go for grazing. Feed preference was determined from the CoP) value calculated from the ratio between the intakes of each individual feed sample divided by the average intake of the all the feed samples (Karbo *et al.,* 1993; Falola *et al*., 2019). On the basis, a feed was taken to be relatively preferred if the CoP value is greater than unity.

$$CoP = \frac{\text{Intake of individual feed offered}}{\text{Mean intake of all the feed offered}}$$

Data analysis

The experimental design was a completely randomized design (CRD), in which the experimental treatments were the only source of variability.

The statistical model is as follows: $Xij = \mu + Ti + \sum ij$

Where Xij = value of observation; μ = population mean; Ti = treatment effect; ∑ij = error term

All data obtained were subjected to the analysis of variance (ANOVA). Means were separated using Least Significant Difference (LSD) SAS (2000) package.

RESULTS AND DISCUSSION

Table 2 shows the proximate composition of ensiled mixture of guinea grass, cassava peel with different proportions of *Centrosema pubescens* and *Delonix regia* seed meal. Similar (P>0.05) dry matter was recorded across the experimental treatments. The DM values ranged from 85.75 – 86.91 %DM. There was a significant (P<0.05) differences in crude protein (CP), ether extract (EE), crude fibre (CF), ash and NFE. The CP and NFE increases with the increasing levels of inclusion of *Centrosema pubescence(CEP)*and *Delonix regia* seed meal*(DSM)*, while the CF, decreases with increasing levels of *CEP* and *DSM*.

The CP (10.84 – 14.52 %) reported for the silages were above the CP threshold for ruminant, McDonald *et al.* (1995) suggested threshold of about 7 to 8% CP to guarantee sufficient utilization of feed. Therefore, the experimental treatments would provide adequate nitrogen requirement by rumen micro-organism to maximally digest the main components of dietary fiber leading to the production of volatile fatty acid (Trevaskis *et al*., 2001; Lamidi, 2009).

It was observed that the CF, decreases with increasing levels of *CEP* and *DSM*, high level of the fibre have been acknowledge to be inversely related to digestibility and nutrient availability. The dietary fibre contributes significantly to be balancing of nutrient requirement in goats it plays a pivotal role in goats production through its influence in the interaction of the intake and digestion of nutrient, dietary fiber intake influence mastication and rumen fermentation (Falola *et al*., 2019).

Table 2: Proximate composition (%DM) of ensiled mixture of guinea grass-cassava peel with different proportions of *Centrosema pubescens and Delonix regia* seed meal

Parameters	T_1	T_2	T_3	T_4	T_5	SEM
Dry matter	86.91	86.84	86.78	86.83	85.75	0.21
Crude protein	10.84^{e}	12.73^{d}	13.85^{c}	14.12^{b}	14.52^{a}	0.35
Ether extract	4.32^{a}	2.27^{b}	2.31^{b}	2.36^{b}	2.42^{b}	0.24
Crude fibre	34.13^{a}	26.16^{b}	24.74^{c}	21.50^{d}	19.66^{e}	1.34
Ash	12.10^{a}	8.25^{c}	8.16^{c}	8.49^{b}	8.21^{c}	0.41
NFE	25.51^{d}	37.40^{c}	37.72^{c}	40.35^{b}	41.93^{a}	1.55

$^{a, b, c, d, e}$ Means on the same row with different superscripts differ significantly (P<0.05); SEM= Standard error of mean

Table 3 shows the coefficient preference for ensiled mixture of guinea grass-cassava peel with different proportions of *Centrosema pubescens* and *Delonix regia* seed meal. The coefficient of preference for T1 was 0.67, 0.89, 1.03, 1.17 and 1.24 for T2, T3, T4 and T5, respectively. The preference ranking is 1^{st} – T5, 2^{nd} – T4, 3^{rd} – T3, 4^{th} – T2 and 5^{th} – T1.

The Coefficient of Preference (CoP) was higher in T5 (1.24) compared to other treatments. CoP is a direct measure of acceptability and nutritional capabilities of a feedstuff (Fasola *et al*., 2019). In recent times, cafeteria techniques have been used to assess the acceptability of some forage, Fasola *et al*. (2019) reported that silage with CoP ranging above unity were accepted or preferred.

Table 3: Feed intake and Coefficient Preference for ensiled mixture of guinea grass-cassava peel with different proportions of *Centrosema pubescens and Delonix regia* seed meal

Experimental treatments	Feed intake (g)	Coefficient preference	Ranking
T1	988	0.67	5^{th}
T2	1,322	0.89	4^{th}
T3	1,523	1.03	3^{rd}
T4	1,740	1.17	2^{nd}
T5	1,832	1.24	1^{st}

CONCLUSION AND RECOMMENDATION

Conclusively, inclusion of *Centrosema pubescens* and *Delonix regia* seed meal enhanced the nutrients and Coefficient of preference of the silage. The T5(70% Guinea grass + 10% Cassava peel + 5% *Centrosema pubescens* + 15% *Delonix regia* seed meal) is recommended for ruminant famers for dry season feeding.

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