

# Nutritive quality of hay and silage from natural grazing land in South Western Nigeria

Victoria O A Ojo<sup>A</sup>, Alaba O Jolaosho<sup>A</sup>, Oluwasanmi M Arigbade<sup>A</sup>, Peter A Dele<sup>A</sup>, Samson A Adeoye<sup>A</sup>, Ronke Y Aderinboye<sup>B</sup>, Oluwaseun J Idowu<sup>A</sup> and Oludotun O Adelusi<sup>B</sup>

<sup>A</sup> Department of Pasture and Range Management, Federal University of Agriculture, Abeokuta, Nigeria [www.unaab.edu.ng](http://www.unaab.edu.ng)

<sup>B</sup> Department of Animal Nutrition, Federal University of Agriculture, Abeokuta, Nigeria [www.unaab.edu.ng](http://www.unaab.edu.ng)  
Contact email: [ojovictoriaoa@gmail.com](mailto:ojovictoriaoa@gmail.com)

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## Introduction

In the tropics, inadequate nutrition caused by scarcity of forages and its low quality constitutes a major constraint to good performance of ruminant animals (Lukuyu *et al.* 2011). Herbage availability during the wet season often exceeds animal requirements (Chakoma *et al.* 1999). As the dry season sets in, the protein level of the accumulated forages drops and the fibre level increases, with an increase in lignin content while voluntary intake decreases. Due to lack of quality forage especially in the dry season, animals feeding on them tend to lose weight and their productivity will be negatively affected.

In order to reduce the limitations of feeds for ruminant animals especially during dry season, there is need to develop feed conservation strategies. The use of high quality forages appears to be the most feasible option to serve this purpose. Therefore, conservation of excess forages produced in the rainy season can be utilized as supplements during the dry season to be able to alleviate poor performance of ruminant animals and will also enhance incomes of small-scale farmers.

The aim of this study was to determine the suitability of conserved forages (hay and silage) from the natural grazing land as dry season supplementary feed for ruminant animals grazing in natural pastureland.

## Methods

This study was carried out at the Department of Pasture and Range Management laboratory, Federal University of Agriculture, Abeokuta Nigeria. The site lies within the derived savannah agro-ecological zone of South Western Nigeria (latitude: 7°N, longitude 3.5°E, average annual rainfall: 1037 mm).

### Experimental diets

Forage samples were harvested from selected portions of natural pastureland. The forages were then sorted out and the proportion of each plant species in the composite weighed and recorded as follows: *Hyparrhenia rufa* (2.06%), *Panicum maximum* (6.21%), *Andropogon tectorum* (11.24%), *Cynodon nlemfuensis* (2.12%), *Andropogon gayanus*, (17.82%), *Pennisetum pedicellatum*,

(2.11%), *Pennisetum purpureum*, (23.11%), and the legumes components were *Calopogonium mucunoides*, (7.45%), *Mucuna pruriens* (9.13%) and *Tephrosia bracteolata* (18.75%). The forages were then divided into two portions and were conserved as hay and silage. Samples of hay, silage and forage species from the natural grazing land during the dry season were analysed for their proximate composition according to AOAC (2000) and fibre contents according to Van Soest *et al.* (1991). *In vitro* gas production, metabolizable energy and organic matter digestibility and short-chain fatty acids determined (Menke and Steingass 1988)

All data were subjected to one-way analysis of variance (ANOVA) in a completely randomised design (CRD) using statistical package (SAS 1999).

## Results

The crude protein (CP) contents of the conserved forage species from the natural grazing land were significantly higher ( $P < 0.05$ ) than the forage species in the natural grazing land during the dry season. The CP values for hay and silage were within the level recommended for optimum ruminant performance in the tropics (Minson 1990). Forage species from the natural pasture land, had higher ( $P < 0.05$ ) NDF, ADF and ADL contents than in the hay and silage. The higher fibre fractions might be due to an increase in stem proportion and cell wall lignifications which made the forage to be more fibrous and less digestible as forage matured. *In vitro* gas production, metabolizable energy and organic matter digestibility were lower with forage species from the natural grazing land during the dry season compared with their contents in the hay and silage. The lower digestibility might be as a result of higher fibre contents, which now made the forages to be less digestible.

## Conclusion

In conclusion, chemical composition and *in vitro* gas production shows that excess forages from the natural pasture that were conserved (hay and silage) could be incorporated as dry season supplement to ruminants that are grazing on poor quality roughages since they are higher in quality than the forage species in the natural grazing land

**Table 1. Chemical composition (g/Kg DM) and *in vitro* gas production of hay, silage and forage samples from the natural pasture.**

Treatment	CP	Ash	NDF	ADF	ADL	GV(ml/0.2 gDM)	c <sub>g</sub> (ml/hr)	ME (MJ/kg DM)	OMD (%)	SCFA (μmol)
Hay	92.0 b	79.0 b	589.0 b	436.3 a	174.7 b	34.33 a	0.09	8.6 b	45.1 b	0.5 b
Silage	108.0 a	106.0 a	574.4 c	363.8 b	128.1 c	33.67 a	0.07	10.7 a	55.4 a	0.7 a
Natural pasture	59.0 c	71.0 c	705.2 a	440.6 a	184.4 a	13.67 b	0.08	5.3 c	32.8 c	0.2 c
±SEM	7.24	5.32	20.73	12.51	8.71	3.44	0.01	0.82	3.29	0.07

Means in the same column with different letters are significantly different ( $P < 0.05$ ). CP: Crude protein; NDF: Neutral detergent fibre; ADF: Acid detergent fibre; ADL: Acid detergent lignin, GV: Gas volume, Cg: Rate of fermentation, ME: Metabolizable energy, OMD: Organic matter digestibility, SCFA: Short-chain fatty acids. SEM- Standard error of mean. Natural grazing land composition during the dry season: (*Pennisetum purpureum*, *Andropogon gayanus*, *A.tectorum*, *Panicum maximum*, *Sorghum almum*, *Stylosanthes hamata*, *Calopogonum mucunoide*, *Centrosema molle*)

during dry season. This highlights one potential technical option for livestock farmers to take advantage of the large quantities of forages in the natural pasture when they are high in quantity and quality during the wet season and utilizing them in the dry season when they become coarse, scarce and low in nutrients.

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