Nutrient composition of Napier grass (Pennisetum purpureum) and Napier grass silages made with different additives

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Introduction Forage contributes about 73% and 95% of the diets of ruminants fattened on grain supplements and on natural ranges respectively (Sarwar & Nisa, 1998). Napier grass is one of the highest yielding tropical forage grasses and was shown to provide a good quality silage when it was supplemented with molasses, as the fermentation quality was not affected by the high storage temperature (40ºC). The objectives of this study were to determine the chemical composition of silages when ensiled alone or mixed with additives.

Materials and methods This study was conducted at the Botswana College of Agriculture (BCA) farm. Napier grass regrowth was harvested manually with a sickle starting with 50cm growth height at the first harvest then monthly at every 25cm of additional growth for five months until the grass attained 1.5m height. Results are presented here only for the first stage of growth. After harvesting, the grass was cut into 2-4cm length and 500g of the cut forage were placed in plastic bags in 4 replicates of each of 6 treatments. The treatments for silage making involved the following additions to 500g of chopped Napier grass (a) no additive, (b) 0.25% $CaCO_3$, (c) 10% sorghum meal, (d) 5% molasses, (e) 1% Urea + 5% molasses and (f) all the additives combined. The sealed plastic bags were stored in the dark at room temperature for 21 d. The nutrient components of Napier grass and its silage were determined according to the procedures of AOAC (1996). The neutral detergent fibre (NDF), acid detergent fibre (ADF), acid detergent lignin (ADL) and *in vitro* true digestibility (IVTD) with rumen liquor were determined according to Van Soest (1994). The data were subjected to analysis of variance, mean values were separated by the Duncan's new multiple range test using SAS (2000).

Results Chemical composition and digestibility of Napier grass and silages are shown in Table 1 harvested at 0.5m cutting height. Inclusion of additives to Napier grass harvested this growth stage improved silage quality significantly compared to fresh Napier grass harvested at the same height.

Table 1 Nutrient and mineral composition of Napier grass and Napier grass silages harvested at 0.50m height of growth (chemical component as % of dry matter, unless otherwise specified)

Type	IVTD	pH	ADF	ADL	CP	ASH)	Ca	P	Fe ppm
FG	64		37.0	3.5	13.3	5.0	0.8	0.7	294
GS	64	4.4	35.5	3.5	13.8	5.0	1.1	0.8	331
GS+$CaCO_3$	64	4.2	33.5	3.5	13.7	5.5	2.2	0.9	319
GS+ so	70	4.1	22.5	3.3	13.9	5.3	1.6	1.0	308
GS+M	68	4.0	28.5	3.0	13.8	5.1	1.9	0.9	341
GS+UM	71	4.1	28.5	2.5	16.5	5.2	2.0	0.9	350
GS+all additives	73	4.2	20.5	2.0	16.6	7.3	2.7	1.0	361
s.e.m	4.2	0.2	1.0	0.8	0.8	0.5	0.1	0.04	5.9

FG= fresh grass, GS= grass silage, so =sorghum, M = molasses, UM=urea and molasses

Conclusions Inclusion of nutrient additives improved nutritive quality of Napier grass silage. The results (not presented here) show that the nutritive quality of Napier grass declines with maturity.

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