Intake and digestibility of nutrients of corn and *Stylosanthes* silages in diets for sheep

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Introduction

The low concentration of water soluble carbohydrates, the high buffering capacity and the low autochthonous population of lactic acid bacteria are limiting factors to legume ensiling. However, recent research with tropical legumes has shown that the silages presented an adequate fermentation profile (Liu *et al.* 2012; Silva *et al.* 2012; Pereira *et al.* 2012). Nevertheless, there are few studies on the use of stylosanthes silages cv. Campo Grande (*Stylosanthes capitata* + *Stylosantes macrocephala*) for sheep feeding. The objective of this study was to evaluate the intake and digestibility of nutrients of stylosanthes and corn silages in sheep diets.

Methods

The experiment was developed at the Department of Animal Science, Federal University of Vicosa, located in Vicosa, Minas Gerais, Brazil. Four rumen-fistulated entire male Santa Ines lambs with an initial average weight of 42.32 ± 3.25 kg, were allotted in a 2x2 factorial arrangement of treatments (2 silages x with and without concentrate) in a 4 × 4 Latin square design. The animals were kept in individual metabolic cages for in vivo digestibility tests. The diets consisted of stylosanthes silage cv. Campo Grande and corn silage, with and without concentrate. The concentrate was formulated with corn, soybean meal and the mixture of urea and ammonium sulfate 9:1 was used to adjust the crude protein (CP) of the diets. The forage:concentrate ratio(F:C) in those animals that received concentrate was 60:40, on dry matter basis (DM). Each of the four experimental periods lasted 14 days, with 10 days for adaptation to the diets and 4 days for data collection. Samples of feed, refusals and feces were subjected to analysis of DM, ash, CP, neutral detergent fiber corrected for ash and protein (NDFap) and ether extract (EE), according Association of Official Analytical Chemists (AOAC). The content of non-fibrous carbohydrates (NFC) was calculated according to Hall (2000). Results were subjected to analysis of variance and the means were compared by the Tukey test, at 5% of probability level, using the SAS software, version 9.0.

Results

An interaction effect of silage type x concentrate was observed on DM, CP and NFC intakes. The NDF intake was affected (P<0.05) only by the type of silage (Table 1). The DMI of the silages was similar (P>0.05) in the

Table 1. Nutrient intake of the diets.

Silage	Concentrate		P value			S.E.M.
	Without	With	S	C	SxC	
DMI (g/d)			0.6198	0.0018	0.031	89.24
Stylosanthes	703.97 aB	1462.02 aA				
Corn	1014.26 aA	1249.24 aA				
DMI (% BW)			0.6773	0.0011	0.0315	0.19
Stylosanthes	1.74 aB	3.19 aA				
Corn	2.13 aA	2.64 aA				
CPI (g/d)			0.9886	0.0193	0.0232	7.68
Stylosanthes	94.67 aB	153.47 aA				
Corn	123.25 aA	124.61 aA				
NFCI (g/d)			0.0077	<0.0001	0.0022	74.29
Stylosanthes	239.59 aB	916.69 aA				
Corn	281.94 aB	591.14 bA				
NDFapI(g/d)			0.008	<0.0001	0.002	35.28
Stylosanthes	374.75 bA	356.67 bA				
Corn	608.00 aA	392.14 aA				

Means followed by different letters, lower case in the columns and capitalized in the lines, differ (P<0.05) by the Turkey test. DMI = dry matter intake; CPI = crude protein intake; NFCI = non-fiber carbohydrates intake; NDFapI = neutral detergent fiber corrected for ash and protein intake; BW = body weight. S = silage type effect. C = concentrate effect. SxC = silage type x concentrate interaction. SEM = standard error of the mean.

Table 2. Apparent nutrient digestibility (%) of the diets

Parameters	Silage		Concentrate		P value			SEM
	Stylosanthes	Corn	Without	With	S	C	SxC	
DM	61.5 b	73.25 a	57.88 b	76.88 a	0.016	0.002	0.173	3.39
CP	70.63	73.88	70.00	74.50	0.202	0.095	0.360	2.39
NDFap	57.38 b	72.13 a	63.63	65.88	0.017	0.633	0.200	3.57
NFC	85.25	93.00	84.88	93.38	0.127	0.100	0.296	2.37

Means followed by different letters differ (P<0.05) by the Turkey test. DM = dry matter; CP = crude protein; NFC = non-fiber carbohydrates; NDFap = neutral detergent fiber corrected for ash and protein. S = silage type effect. C = concentrate effect. SxC = silage type x concentrate interaction. SEM = standard error of the mean.

diets without concentrate, with values of 703.97 and 1014.26 g/d for stylosanthes and corn silages, respectively. Stylosanthes silage had highest (P<0.05) DM and CNF intakes in presence of the concentrate.

Probably, to supply the same energy demand, the animals consuming stylosanthes silage selected a diet with high NFC content and consumed more DM than diets with corn silage, given the nutritional characteristics of stylosanthes silage, such as high content of indigestible neutral detergent fiber (iNDF). NDFap intake was affected (P<0.05) only by the type of silage, with a higher value recorded in animals fed corn silage. There was no effect of the silage x concentrate interaction (P>0.05) on the apparent digestibility of nutrients. However, the DM and OM digestibilities were affected by silage (P<0.05) and concentrate (P<0.05). The lowest digestibilities of these nutrients were recorded for stylosanthes silage.

Conclusion

Stylosanthes silage with concentrate has a higher dry matter intake compared with corn silage, indicating significant potential of use in sheep feeding.

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