Effects of Tropical Legume (*Stylosanthes cv.* Campo Grande) Silage and Dietary Protein Levels on Animal Performance of Finishing Beef Cattle

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Effects of tropical legume (Stylosanthes cv. Campo Grande) silage and dietary protein levels on animal performance of finishing beef cattle

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Introduction

Recently, the interest in legume silage for livestock systems has increased in tropical countries (Heinritz *et al.*, 2012) because of the high inclusion of the protein sources in the concentrate used in feedlot diets, like soybean meal. *Stylosanthes cv.* Campo Grande was developed in Brazil and this cultivar has a good adaptation to tropical conditions, as soils with low fertility and high acidity (Fernandes *et al.*, 2005). Recently, this legume has been indicated for silage making because of its nutritional value and previous results with beef cattle have showed similar performance and digestibility in comparison with corn silage (Souza *et al.*, 2014). The objective of this study was to evaluate the effects of *Stylosanthes cv.* Campo Grande silage (StS) and corn silage (CS) with two dietary protein levels.

Materials and Methods

The experiment was conducted at the "Central de Experimentação, Pesquisa e Extensão do Triângulo Mineiro" (CEPET), Federal University of Vicosa (UFV). Fourty Nellore, with body weight of 374.33 ± 2.62 kg, were allotted in a 2 × 2 factorial arrangement of treatments (2 silages × 2 protein levels) in a randomized block design with ten replicates. The animals were kept in individual stalls of 10 m^2. The treatments (Table 1) were StS and CS with two protein levels (PL; 11% and 13% CP on DM basis).

Table 1. Proportion of the ingredients in the diets

	Treatments			
Items (%)	**CS-11**	**CS-13**	**StS-11**	**StS-13**
Stylosanthes silage	-	-	50.00	50.00
Corn silage	50.00	50.00	-	-
Ground corn	42.05	42.05	42.05	42.05
Wheat meal	3.00	0.00	6.00	3.00
Soybean meal	3.21	5.72	0.70	3.21
Ureia/ ammonium sulfate (9:1)	0.58	1.03	0.13	0.58
Mineral mix[1]	1.11	1.11	1.11	1.11

[1]Calcium 150.0 g/kg, cobalt 671.0 mg/kg, copper 979.0 mg/kg, phosphorus 90 g/kg, iodine 685.5 g/kg, manganese 944.0 mg/kg, magnesium 11.0 g/kg, sulfur 160.0 g/kg, fluoride 710.0 mg/kg, selenium 23.3 mg/kg, sodium 160.0 g/kg and zinc 3.6 g/kg.

The experiment lasted 99 days, divided in three periods of 28 days each, after 15 days of adaptation. The animals were fed twice per day, at 8 a.m. and 4 p.m. Samples of the food and refusals were collected daily and at the end each period were collected feces. The animals were slaughtered at the end of the experimental period for determination of carcass yield (CY), which was calculated by dividing the hot carcass weight by the final body weight in fasting, and the carcass average daily gain (CADG) that was obtained through the final carcass weight in relation to the carcass weight at the beginning of the experiment, after the adaptation period.
The samples of food, orts and feces were processed and submitted to chemical analysis according to Association of Official Analytical Chemists (AOAC). Data were analyzed including in the model the fixed effects of silage (S), PL and the interaction S × PL. The value $\alpha = 0.05$ was adopted for all analyzes using the SAS software, version 9.0.

Results and Discussion

There was no effect of the interaction S × PL ($P > 0.05$). There was effect of S ($P < 0.05$) on intake of DM, OM and NDF and effect of S and PL on CP intake, but there was no effect ($P > 0.05$) on TDN intake. The digestibility was affected ($P < 0.05$) only by S. There was no effect ($P > 0.05$) of the diets in the evaluation of animal performance.

Table 2. Intake, digestilibity and performance of beef cattle

	Silage			Protein Level (%)		SEM	P-value		
	Stylosanthes	**Corn**		**11**	**13**		**S**	**PL**	**S × PL**
	Intake (kg)								
DM	10.35	9.35		9.75	9.94	0.14	<0.01	0.42	0.34

OM	9.56	8.95	9.20	9.31	0.12	0.01	0.62	0.33
CP	1.27	1.13	1.10	1.30	0.02	<0.01	<0.01	0.52
NDF	3.31	2.96	3.10	3.17	0.05	<0.01	0.44	0.90
iNDF	1.57	0.91	1.21	1.26	0.06	<0.01	0.18	0.95
TDN	6.02	6.17	6.06	6.13	0.08	0.34	0.62	0.70
DM%BW	2.40	2.18	2.28	2.31	0.03	<0.01	0.58	0.24
	Total apparent digestibility (g/kg intake)							
DM	609.40	660.48	637.10	632.06	7.38	<0.01	0.66	0.56
OM	627.29	683.39	657.63	653.05	7.71	<0.01	0.73	0.50
CP	661.50	753.14	705.36	709.28	10.73	<0.01	0.81	0.99
NDF	482.29	575.94	539.21	519.01	10.12	<0.01	0.13	0.08
	Performance[a]							
ADG	1.34	1.27	1.26	1.35	0.03	0.30	0.18	0.80
CADG	0.80	0.77	0.77	0.80	0.03	0.64	0.53	0.84
CY	54.06	54.14	54.25	53.95	0.29	0.89	0.63	1.00

[a] ADG = average daily gain (kg); CADG = carcass average daily gain (kg); CY = carcass yield (%).

Conclusion

Stylosanthes cv. Campo Grande silage is a suitable roughage source to be used in diets for finishing beef cattle because its similar intake of TDN and animal performance in comparison with corn silage. The dietary protein level does not affect the animal performance.

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