

Chemical characteristics effects in the tropical grasses ensiling process

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Introduction Silage is considered an important feed strategy for ruminants during the dry period in tropical regions, where C4 grasses are an alternative to corn and sorghum, due to its great productivity. However, buffering capacity, dry matter (DM) and water-soluble carbohydrates contents are important forage characteristics to assure great fermentation during the ensiling process. However, some of these forage characteristics are a challenge to be addressed in the ensiling process of the tropical grasses, which may result in great losses during the fermentation process phases. Thus, some techniques can be used to improve the silage fermentation of tropical grasses, such as reduction on the plant water content through wilting or pre-drying, increasing the DM content and providing better conditions for the lactic acid bacteria growth. The chemical characteristics evaluation of the recently released tropical grass, such as Zuri [*Panicum maximum* Jacq. cv. BRS Zuri] and Capiaçú [*Pennisetum purpureum* Schum cv. BRS Capiaçú], are scarce, especially regarding its use for ensiling. Based on that, our objective was to evaluate the forage chemical composition of Zuri and Capiaçú grasses immediately after harvest (*in natura* forage) and after silo opening (silage).

Materials and Methods The field experiment was carried out at Embrapa Agrossilvipastoril, and the chemical analyses were performed at the Forage Laboratory of the Federal University of Mato Grosso, Sinop-MT. The experimental design was completely randomized with five replicates, and 2x4 factorial arrangement with two forage conditions (*in natura* forage and silage) and four forages (fresh and wilted Capiaçú, and fresh and wilted Zuri). The grasses were harvested and ensiled in January 2018. Capiaçú was cut at 5 cm aboveground when the plants were ~2.0 m high, and Zuri canopy height was ~1.0 m when was harvested at 0.3 m. The Zuri and Capiaçú samples were immediately chopped (particle size: 10 to 20 mm) or wilted for 1 h and subsequently chopped. Experimental units consisted of silos (2.75 L), which were filled to reaching a density of 550 kg m⁻³ of *in natura* forage and closed for 91-days period. The *in natura* forage and silage samples were dried at 55°C for 72 h in a forced-air dryer. Subsequently, the samples were milled to pass a 1 mm sieve and proceeded to chemical analyses. The ashes, crude protein (CP) and neutral detergent fiber (NDF) contents were analysed according to the methodology described by Dettman *et al.* (2012). Data were submitted to the analysis of variance and the mean comparisons were performed using the LSD test (P<0.05).

Results and discussion For Zuri, either fresh or wilted, the increase in ash content with the ensiling (Table 1) is due to the greater gas losses measured during the ensiling process, as reported by Amaro *et al.* (2018), which concentrated the ash content. On the other hand, the decrease in ash content for fresh and wilted Capiaçú may be due to the great effluent losses (Amaro *et al.*, 2018), when evaluating the silage losses of these cultivars. The lower CP

levels registered in the silage compared to the *in natura* forage, both fresh and wilted (Table 1), are due to the N losses, since all treatments presented silage ammonia-N content greater than 10% of the total N. Zuri had a CP content lower than the minimum recommended of 7%, which may impact animal performance. The decreased NDF content in all treatments silages (Table 1) is due to breakdown of hemicellulose by enzymes or acid hydrolysis. All treatments presented high NDF content, a characteristic that may reduce silage intake by ruminant animals.

Table 1. Chemical composition (% DM) of the *in natura* forage and silage of Capiaçú elephant grass and Zuri guinea grass, fresh and wilted. Sinop-MT, 2018.

Condition	Treatments				Mean
	Capiaçú		Zuri		
	Fresh	Wilted	Fresh	Wilted	
	Ash				
Forage (<i>in natura</i>)	10.07abA	9.41cA	10.26aB	9.92bB	9.92
Silage	9.82cB	9.11dB	11.20aA	10.42bA	10.14
Mean	9.94	9.26	10.73	10.17	
CV (%)					1.59
	Crude Protein				
Forage (<i>in natura</i>)	8.38	7.97	5.84	5.86	7.02A
Silage	8.18	7.65	5.31	5.55	6.67B
Mean	8.28a	7.81b	5.58c	5.70c	
CV (%)					4.06
	Neutral Detergent Fiber				
Forage (<i>in natura</i>)	68.88cA	69.55cA	71.75bA	73.07aA	70.81
Silage	66.43bB	65.05cB	69.12aB	67.57bB	67.04
Mean	67.65	67.30	70.43	70.32	
CV (%)					1.31

CV: Coefficient of variation. Means followed by the same capital letter in the column and by small letters in the row do not differ among themselves by LSD test ($p > 0.05$).

Conclusion The chemical characteristics of elephant grass cv. Capiaçú and Zuri guinea grass are affected by the ensiling process. The wilting process may be an alternative to reduce the ash and fiber content in both cultivars, however it could also reduce the crude protein content of Capiaçú.

References

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