Microbial populations in buffel grass silages added with corn bran

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Introduction The process of conservation through grass silage involves the losses of nutritive value due to chemical changes that occur due microbial development and plant enzymatic processes. Several factors affect the fermentative profile and hence the quality silage, among which may be mentioned the original contents of dry matter and soluble carbohydrates and initial number lactic acid bacteria. According to Pereira et al. (2007) the quantification of the number of microorganisms present in the plant and during fermentative process is fundamental to understand the aspects related to the pattern of silage fermentation. Thus, the aim of this research was to quantify the microbial populations of buffelgrass silage added with corn bran.

Materials and Methods It was used a pasture of buffel grass (*Cenchrus ciliaris* cv. Biloela) already implanted 28 years ago, at the Pendência Experimental Station, which belongs to the State Company for Agricultural Research of Paraíba. It was used 5 x 5 factorial combination (five levels of corn bran x five fermentation periods), in a completely randomized design with three replications. The levels of corn bran used were 0, 50, 100, 150, 200 g/kg, added based in the natural matter of bran and of grass and the fermentation periods evaluated were 1, 3, 7, 15 and 30 days. At the start of the experiment, conducted a uniformity cut height of 10 cm from the soil and a fertilized with 50 kg/ha of nitrogen as ammonium sulfate. The grass was harvested when had 50 cm of height, with the aid of costal mower, to the 10 cm of soil, and then, chopped in a forage machine stationary previously regulate for the size particles of 2.0 cm. The corn bran was added to the chopped material according with the percentage of each treatment. The material was ensiled in PVC tubes provided with Bulsen valve to exhaust the gas and amount known of sand in the bottom of the silo to capture the effluent. The microbial populations were quantified using selective culture media for each microbial group: Rogosa Agar (Difco) for enumeration of lactic acid bacteria (LAB), Brilliant Green Bile Agar (Difco) for enumeration of enterobacteria, and Potato Dextrose Agar (Difco) for enumeration molds and yeasts. The microbial group enumeration was performed from a 10 g sample silage of each repetition per treatment in different fermentation periods, to which were added 90 mL phosphate buffer and homogenized in industrial blender for 1 minute to obtain a 10^{-1} dilution. After that, successive dilutions were performed in order, aiming to obtain dilutions ranging from 10^{-1} to 10^{-9}, once 30 and 300 colony forming units (cfu) were considered to be counted reliable.

Results and Discussions The LAB populations in buffel grass silages remained high independently of fermentation periods and levels of corn bran (Table 1). The LAB population showed dominant over other microbial groups reaching 9.69 log cfu/g in seventh day of fermentation. This behavior may be occurred due adequate concentrations of soluble carbohydrates, the mean substrate used in fermentation of

these bacteria. For the enterobacteria populations was observed there was reduced development of this microbial group, coming to disappear in fifteenth day of fermentation for all levels of corn bran, except of the 200 g/kg of inclusion. However, on the 28th day of fermentation the populations of this microbial group were detected again in silages treated with 50 and 150 g/kg of corn bran. This behavior is excepted because these microorganisms possess the ability to protect themselves when find under adverse conditions (Pereira et al., 2007). The greater development of LAB and consequent acidification of silage may be associated with reduced growth of enterobacteria. The yeasts and molds populations were present in greater number from the seventh day of fermentation, with a stabilizing tendency between 15th and 30th. This increase from the seventh day of fermentation may be occurred by a major acidification of silage, because greater of lactic acid by LAB, and permanence sufficient concentrations soluble carbohydrates, resulting in a favor environmental for the development of yeasts. The stabilization of molds and yeasts populations from the 15th day of fermentation may be related to the reduction in residual soluble carbohydrates, limiting the development of these microorganisms.

Table 1 Enumeration of lactic acid bacteria (LAB), enterobacteria and molds and yeasts (MY) in buffel grass silage added with corn bran (CB) and throughout the fermentation period (days)

Levels CB (g/kg)	Fermentation period (days)				
	1	3	7	15	30
	LAB (log cfu/g forage)				
0	6.34	8.36	8.70	9.29	8.34
50	7.44	8.84	8.39	8.97	8.01
100	7.57	8.53	8.81	9.13	7.55
150	8.06	8.25	7.78	8.41	8.58
200	5.09	8.44	9.69	7.68	9.37
	ENT (log cfu/g forage)				
0	4.16	4.21	ND[3]	ND	2.04
50	2.59	3.30	ND	ND	ND
100	2.31	3.50	3.25	ND	3.27
150	ND	3.89	3.89	ND	ND
200	ND	1.99	4.26	3.43	2.49
	MY (log cfu/g forage)				
0	5.02	5.87	5.65	5.62	5.59
50	3.53	5.74	5.51	6.48	6.06
100	4.43	4.68	6.63	6.28	6.19
150	2.90	5.31	6.78	6.06	5.78
200	4.40	5.50	8.68	6.21	5.86

Conclusions The added of corn bran does not affect the development of microbial population in the ensilage process of buffel grass. The quantification of microbial populations in buffel grass silages are suitable for a good fermentation.

Reference

Pereira, O. G., K. D. Rocha, C. L. L. F. Ferreira. Composição química, caracterização e quantificação da população de microrganismos em capim-elefante cv. Cameroon (Pennisetum purpureum, Schum.) e suas silagens. *Rev. Bras. Zootecn.*, 2007; 36:1742-1750.