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Synergism of chemical and microbial additives on sugarcane (*Saccharum officinarum* L.) silage fermentation

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Introduction Sugarcane has a high productive potential (30 t DM/year) and it is commonly used in its fresh form. The ensiling of sugarcane is increasing but little research has been carried out to reduce nutrient losses during fermentation.

Material and methods The tested cultivar was SP70-1143. The production observed at 15 months of vegetative growth was 80 t/ha with 16% of pol (sucrose in sugarcane juice). Following factorial scheme with three inoculations (control, *Propionibacterium acidipropionici* (cepa MS 01) (PROP) + *Lactobacillus plantarum* (Cepa MA 18/50) and *Lactobacillus buchneri* (Cepa NCIMB 40788) (BUCH)) and four chemical additives (control, urea (1.5% DM), sodium benzoate (0.1% DM) and sodium hydroxide (1% DM)), with three replications was evaluated. *In vitro* dry matter digestibility (IVDMD) was estimated as amount of residual digestible DM in relation to digestible DM ensilaged, and dry matter recovery (DMR) was determined. This work aimed to evaluate quantitative and nutritional losses during the fermentative process associated with sugarcane ensilage.

Results Silage treated with BUCH in relation to those inoculated and silages treated with NaOH compared to those treated with chemical additives had higher IVDMD. There were synergic effects between BUCH and NaOH (Table 1). Higher IVDMD means that the silage nutritive value was maintained in relation to original forage. The yeast activity is intense during sugarcane ensilage (Alli *et al.*, 1983 and Pedroso *et al.*, 2002) promoting high soluble sugar consumption and, consequently, reduction in DM and IVDMD. Inoculation with BUCH controlled yeast population, probably because of their capacity for acetic acid production, which reduced the quantitative and qualitative losses in sugarcane ensilage.

Table 1 Recovering of DM (DMR) and IVDMD in relation to chemical and microbial additives, expressed in percentage of sugarcane dry matter ensilaged

	DMR (%)				IVDMD (%)			
	Control	PROP	BUCH	Mean	Control	PROP	BUCH	Mean
Control	67.5 Bb	66.4 Bc	80.8 Ac	71.6 d	45.0 Bc	39.8 Bc	74.3 Ab	53.0 d
Urea	72.8 Ba	75.0 Bb	79.7 Ac	75.8 c	51.6 Bb	64.0 Ab	63.7 Ac	59.8 c
Benzoate (0.1%)	74.8 Ba	74.8 Bb	87.2 Ab	78.9 b	53.2 Bb	58.5 Bb	80.6 Aab	64.1 b
NaOH (1%)	76.1 Ca	86.5 Ba	93.7 Aa	85.4 a	68.5 Ca	76.0 Ba	84.8 Aa	76.4 a
Mean	72.8 C	75.7 B	85.3 A	77.9	54.6 C	59.6 B	75.9 A	63.3
*CV (%)				2.17				4.59

Mean followed by the same capital letter in line and small letter in column are statistically similar by Tukey test ($P < 0.05$).

* Coefficient of variation

Conclusions The *L. buchneri*, even in an isolated action, was efficient for controlling quantitative and qualitative losses during sugarcane ensilage. Association of microbial inoculums aiming to control losses provoked by yeast and NaOH seems to be an alternative for enhancing the effects of inoculums.

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