

**Title: CHITOSAN ADDING IMPROVED MICROBIOLOGICAL QUALITY OF SILAGE FROM SUGAR CANE (SACCHARUM OFFICINARUM L)**

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**ABSTRACT:**

The use of sugarcane as forage becomes viable due to its high nutritional value especially energy. In the ensiling process may occur the growth of undesirable microorganisms that produce toxins, reduce the nutritional value and dry matter. Recently, studies tend to characterize chitosan preferably as bacteriostatic, literature considers chitosan as holder of bactericidal or bacteriostatic activity, although not clarify the distinction between the two mechanisms of action. Aiming to reduce these problems, the objective of this study was to evaluate the use of chitosan in sugarcane silage. It was used 40 experimental silos in a completely randomized design. 1- Control (without biologic additive); 2-LB (*Lactobacillus buchneri*  $2,6 \times 10^{10}$  CFU/g); 3-BSLB (*Bacillus subtilis*  $1 \times 10^9$  CFU/g + *Lactobacillus buchneri*  $9 \times 10^9$  CFU/g); 4- CHIT (chitosan inclusion 1% in natural matter). Bacterial inoculants were used at a dosage of 2 g / ton of natural matter. The silos were opened after 60 days of fermentation. The samples were collected, being taken from various parts of the silos. It was used 10 grams of each sample to 90 ml of sterile saline for serial dilution of  $10^{-1}$  till  $10^{-6}$  in test tubes. Quantification of microorganisms were done in triplicate for each dilution and the culture medium, by using the MRS agar (de Man, Rogosa and Sharpe) for enumeration of lactic acid bacteria, PCA (Plate Count Ágar) for the total count of aerobic and anaerobic bacteria, these incubation with at 37 ° C for 48 hours; for yeast and mold count the Agar PDA (Potato dextrose agar) with incubation at 26 ° C for 120 hours. Means were transformed to log<sub>10</sub>. Statistical analyzes were performed by the orthogonal contrasts PROC MIXED SAS (2009), where C1 (control vs. inoculants); C2 (control vs chitosan); C3 (chitosan vs LB + BSLB). No difference was observed between treatments for total bacteria count. The CHIT treatment had higher counts of lactic acid bacteria compared to the Control, LB and BSLB treatments. The control treatment showed lower counts of anaerobic and aerobic bacteria compared to LB, BSLB and CHIT treatments. The silage inoculated with chitosan showed lower count of molds and yeasts compared to the control, but did not differ from LB and BSLB treatments. The addition of chitosan in silage sugarcane improved microbiological quality of the silage material.

**Keywords:** *Bacillus subtilis*, chitosan, ensiling, *Lactobacillus buchneri*

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