TITLE: COMPARISON OF MICROBIAL COMMUNITIES ENDOGENOUS FROM UNPRETREATED AND PRETREATED SUGARCANE BAGASSE

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ABSTRACT

Microbial communities play a key role in degradation of lignocellulosic biomass and its conversion into bioproducts such as hydrogen, methane and organic acids. In this sense, understanding the composition and diversity of microbial communities is important to estimate their specific role in the global carbon cycle. The foremost aim of this study is to characterize the microbial communities from unpretreated and pretreated sugarcane bagasse, to evaluate the potential of this substrate also as inoculum for the production of biofuels. The sequencing of 16S rRNA gene was performed in platform MiSeq - Illumina, with the set primer 341F-785 R. The sequences were deposited in the NCBI with the accession number SRX1799825 and SRX2754705. In the unpretreated sugarcane bagasse were found microorganisms able to degrade lignocellulosic biomass such as similar to the genera *Streptomyces* (20.32%), *Paenibacillus* (10.64 %), *Stenotrophomonas* (8.27 %) and *Sphingomonas* (7.01%). Similarly, the genus *Novosphingobium* (1.38%) and *Paenibacillus* (10.64%) are able to degrade lignin. *Novosphingobium* sp. B-7 and *Paenibacillus glucanolitycus* degrade black liquor, generated from Kraft process of paper mills. Other genus identified on the unpretreated sugarcane bagasse were *Enterobacter* and *Pseudomonas* (2.89% and 1.24 %, respectively). Species of *Pseudomonas* are tolerant to inhibitors generated during the saccharification of lignocellulosic biomass such as furfural (exceeding 3.0 g/L) and 5-HMF (exceeding 6.0 g/L). The main bacterial genera and species found in the autoclaved sugarcane bagasse were similar to: *Clostridium cellobioparum* (32.29%), *C. bifermentans* (31.91%), *C. sartagoforme* (14.63%), *Paenibacillus graminis* (8.10%), *C. cellulolyticum* (5.69%), *P. timonensis* (3.57%) and others bacteria identified with relative abundance lower than 1% (3.81%). *Clostridium* spp. and *Paenibacillus* spp., both Firmicutes Phylum are able to form oval or spherical endospores and this characteristic favored the survival of these bacteria after autoclaving. The species of *Clostridium* identified in this study are cellulolytic. *Clostridium* and *Paenibacillus* have hydrogen producer species and may contribute with experiments of biogas production. In conclusion, the use of untreated or autoclaved sugarcane bagasse is a highlight, since, it could be as well substrate as source of endogenous bacteria able to degrade the lignocellulosic substrate and producing biogas.

Keywords: biofuel; Illumina MiSeq, 16S rRNA; lignocellulosic biomass

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