TITLE: EVALUATION OF EFFECTS OF AERATION IN THE PRODUCTION OF XILITOL AND ETHANOL BY YEAST *STARMERELLA MELIPONINORUM*

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ABSTRACT:

Several studies have focused on the use of lignocellulosic biomass in the microbial production of xylitol and/or second-generation ethanol. Such efforts are important for the understanding of the behavior of microorganisms during the metabolism of xylose since it is a carbon source present in agricultural and forest waste and co-products. The yeast production of ethanol or xylitol from pentoses is strictly related to the amount of oxygen present in the medium. In order to make xylitol production feasible it is necessary to determine growing conditions for xylose fermenting yeasts in order to obtain high yields and productivity. Due to the several issues found in xylose fermentation, this work aims to contribute in this area by evaluating the effects of different levels of agitation on the production of xylitol from xylose by *S. meliponinorum* strain FRP.09. Fermentation experiments were carried out at 150 and 200 rpm without aeration and a static control. Besides, fermentation tests were also performed in a bioreactor with air flow of 0.1 vvm/100 rpm, 0.25 vvm/150 rpm and 0.5 vvm/200rpm. All experiments were carried out for 96 hours at 28° C and pH 4.0. The following parameters were evaluated for all experiments: xylose consumption, ethanol production, xylitol production, growth and cell viability. The results showed that fermentation performed under anaerobic conditions affected the cellular viability of yeast *S. meliponinorum*. Increased agitation and increased airflow significantly increased xylose consumption in both shaken vials and in the bioreactor. In the experiments in shaken flasks there was no difference in the production of xylitol and ethanol in the two agitation levels. In bioreactor the higher production of xylitol was reached in the higher air flow/agitation rate. Ethanol production was not detected in any of the evaluated conditions.

KEYWORDS: Yield, Volumetric Productivity, cell viability