Title: Physiological characterization of xylose fermenting yeast of the genus *Spathaspora*.

Authors: Ribeiro, L.E.[1]; Campos, V. J.[1]; Galvão, G. R.[1];Fietto, L. G.[1]

[1]UFV- Universidade Federal de Viçosa (Avenida Peter Henry Rolfs, s/n-Campus Universitário, Viçosa – MG, 36570900)

The second generation ethanol is important for the increasing of ethanol productivity per planted area, by fermentation of the sugars contained in the residual lignocellulosic composition, such as sugar cane bagasse. Most abundant sugars for the fermentation process in lignocellulosic biomass are glucose and xylose. The significant production of second generation ethanol depends on the efficient conversion of these two major sugars for fermenting microorganisms. However, the xylose conversion to ethanol is a major problem for second generation ethanol, once yeast widely used in fermentation, *S. cerevisiae*, does not assimilate that sugar. Yeasts *Spathaspora arborariae* and *Spathaspora passalidarum*, are considered promising for industrial fermentation of lignocellulosic hydrolysates, de their efficiently ability to convert xylose to ethanol . Thus, the aim of this study was to evaluate the best fermentation conditions and physiological characteristics of these yeasts. Fermentation was performed in batch experiments with different xylose concentrations (4, 8 and 10%) and temperatures (28, 32 and 35 °C). The best conditions were subsequently selected for evaluation in cofermentation with glucose (2 and 4%). Samples of the fermentation were collected at time 0, 3, 6, 9, 12, 20, 30, 40, 50, 60 and 70 hours for evaluation of kinetic and fermentation parameters. Both yeasts grow at similar rates in different concentrations of sugar, showing tolerance to high concentrations of xylose. Regarding the different temperatures measured, *S.arborariae* and *S. passalidarum* show good growth in a temperature range of 28 to 35 °C. To evalute the ethanol yield, *S. arborariae* showed the highest yield of 10% xylose at a temperature of 28 °C (27.6 g/L), while *S. passalidarum* showed the highest yield of 10% xylose at 32 °C (38.4 g/L). In cofermentation assays, these yeasts preferentially consume glucose. Cell viability was not are affected during all fermentation process. *S. passalidarum* proved to be promising for ethanol production due its high levels of ethanol production in a short period of time and lower xylitol and glycerol yields, in all conditions evaluated. At higher temperatures, *S. arborariae* produced higher yields of xylitol, and is therefore, considered promising for the production of this product, however, further studies need to be done to optimize this process, as well as to analyse the effects of inhibitors in the process.

Keywords: second generation ethanol, *Spathaspora arborariae, Spathaspora passalidarum*
Agência Fomento: CNPq