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Metabolomics of xylose-fermenting yeast for increasing efficiency in the production of second generation ethanol

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The growing demand for alternative energy sources, adding value to products and utilization of residual biomass, as well as reducing the negative impacts on the environment, have encouraged the development of processes for producing ethanol from second generation (2G), ie, ethanol produced from lignocellulosic biomass. However, a bottleneck in the production of ethanol 2G is the inability of the yeast *Saccharomyces cerevisiae*, used in industry worldwide microorganism to produce ethanol, to convert pentoses such as xylose to ethanol (RUDOLF et al, 2009). Xylose is the second most abundant sugar on biomass, with about 33 % of fermentable sugars in the sugarcane bagasse (SASSNER et al, 2008). Given the importance of utilizing xylose to ethanol production, research have been done to identify yeast strains able to ferment pentose, highlighting two strategies: the identification of strains naturally capable of fermenting xylose and the development of recombinant strains of *S. cerevisiae* (WOHLBACH et al 2011; HÄGERDAL - HAHN et al, 2007). In this work, metabolomics approaches has been used to identify and quantify targets in the metabolic pathway for ethanol production from xylose. A method has been developed using UPLC-MS (Xevo TQD, Waters). ESI(+) and ESI(-)-MS, MS/MS and MRM experiments were performed in different conditions to obtain a sensitive and selective method of targeted metabolomics. Finally, a reliable method based on targeted metabolomics approaches were developed and optimized to yeasts. In addition, the established protocol was applied to two xylose fermenting yeasts.

Biography

Patrícia Verardi Abdelnur has completed his PhD at the age of 27 years from State University of Campinas, performed a part of her PhD at Mass Spectrometry Research Center (MSRC), at Vanderbilt University. She is a Researcher at Brazilian Enterprise for Agricultural Research, in the National Center for Agroenergy Research. She has published more than 20 papers in reputed journals and has been serving as a reviewer in scientific journals.

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