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Syncrotron radiation as a tool to determine chemical structure modification of wheat straw (Triticum aestivum) treated with an enzymatic extract obtained from Methylotrophic Bacteria.

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Abstract content

Vegetal biomass, also called lignocellulose, is distinguished by being refractory to physicochemical and enzymatic treatments [1]. Several factors are the responsable of this recalcitrance behaivor as the cristallinity and composition of biomass (Cellulose, hemicellulose and lignin). The efficient enzymatic saccharification of cellulose at low cellulase (protein) loadings continues to be a challenge for commercialization of a process for bioconversion of lignocellulose to etanol [2]. Cellulases are enzymes that hydrolyze the ß-(1 → 4)-linkages in cellulose. Though cellulase research has been concentrated mostly in fungi, actinomycetes, and protozoa, there is an increasing interest in cellulose production by bacteria [3-5]. In this context, pink pigmented facultative methylotrophs (PPFMs) are a physiologically interesting group of bacteria that are capable of growing on single carbon such as methanol and methylamine, as well as on C2, C3, and C4 compounds [6]. These bacteria can be found in plant phyllosphere and are not considered to be passive passengers on plant leaves, and is known that can stimulate seed germination and plant development. Though earlier studies indicate cellulase production by PPFMs [7] that can be used for transform cellulose in glucose in a bioethanol process. This work proposes the use μ-FTIR in order to understand the structural changes during enzymatic hydrolysis of lignocellulosic biomass that could lead to improved processes and cost reductions for bioethanol production.

1. Valdez-Vazquez I., Pérez-Rangel M., Tapia A., Buitrón G. Molina C., Hernández G., Amaya-Delgado L. 2015. Hydrogen and butanol production from native wheat straw by synthetic microbial consortia integrated by species of Enterococcus and Clostridium. Fuel, 159: 214-222. IN PRESS doi:10.1016/j.fuel.2015.06.052
2. Arantes V, Saddler JN. Access to cellulose limits the efficiency of enzymatic hydrolysis: the role of amorphogenesis. Biotechnol Biofuels 2010;3:4.
3. Nipa, M. N., Sultana, S., & Hakim, M. A. (2006). Bangladesh Journal of Microbiology, 23(2), 174–176.
4. Gosh, B. K., Gosh, A., & Salnar, A. (1987). In J. Chaloupka & V. Krumphanzl (Eds.), Extracellular enzymes of microorganisms: Cellulase secretion from a hypercellulolytic mutant (pp. 157–172). New York: Plenum.
5. Lynd, R. L., Weimer, J. P., Van Zyl, H. W., & Pretorius, S. I. (2002). Microbiology and Molecular Biology Reviews, 66, 506–577.
6. Chistoserdova, L., Chen, S. W., Lapidus, A., & Lidstrom, M. E. (2003). Journal of Bacteriology, 185 (10), 2980–2987.
7. Madhaiyan, M., Park, M. S., Lee, H. S., Kim, C. W., Lee, K. H., Seshadri, S., et al. (2004). Korean Journal of Soil Science and Fertilizer, 37(1), 46–53.

Summary

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