

Study on Microbial Pretreatment for Enhancing Enzymatic Hydrolysis of Corncob

Authors : Kessara Seneesrisakul, Erdogan Gulari, Sumaeth Chavadej

Abstract : The complex structure of lignocellulose leads to great difficulties in converting it to fermentable sugars for the ethanol production. The major hydrolysis impediments are the crystallinity of cellulose and the lignin content. To improve the efficiency of enzymatic hydrolysis, microbial pretreatment of corncob was investigated using two bacterial strains of *Bacillus subtilis* A 002 and *Cellulomonas* sp. TISTR 784 (expected to break open the crystalline part of cellulose) and lignin-degrading fungus, *Phanerochaete sordida* SK7 (expected to remove lignin from lignocellulose). The microbial pretreatment was carried out with each strain under its optimum conditions. The pretreated corncob samples were further hydrolyzed to produce reducing glucose with low amounts of commercial cellulase (25 U•g⁻¹ corncob) from *Aspergillus niger*. The corncob samples were determined for composition change by X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), and scanning electron microscope (SEM). According to the results, the microbial pretreatment with fungus, *P. sordida* SK7 was the most effective for enhancing enzymatic hydrolysis, approximately, 40% improvement.

Keywords : corncob, enzymatic hydrolysis, glucose, microbial pretreatment

Conference Title : ICBBS 2014 : International Conference on Biotechnology and Biological Sciences

Conference Location : Singapore, Singapore

Conference Dates : September 11-12, 2014