# LIGNIN ADSORPTION AND ENZYMATIC SACCHARIFICATION OF IN HOUSE PRODUCED CELLULOLYTIC ENZYMES WITH NOVEL AND CONVENTIONAL METHODS

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Two key points to reach high yields in enzymatic hydrolysis are studied in this research, which are the cellulases source produced by different cultivation system and the lignin affinity of the cellulolytic preparations. Three cellulolytic preparations (two in-house cellulolytic enzymes and commercial CellicCtec2) were compared in terms of their saccharification performance of cellulose and affinity to lignin derived from steam-exploded sugarcane bagasse. In-house cellulolytic enzymes from *Trichoderma reseei* Rut-C30, were produced by two cultivation systems: submerged fermentation (SmF) and sequential fermentation (SF). Enzymatic hydrolysis and adsorption assays used three different substrates: avicel, isolated lignin and steam-exploded sugarcane bagasse (SEB) and two protein loadings 0.23 and 1.1 mg/mL. Experiments of 24 hours showed that at low loadings, protein adsorption in lignin and SEB were around 100% while the conversion of cellulose in SEB reached almost 35% and 6% for the commercial and SF enzymes respectively. At high loadings, the highest adsorption and conversion in SEB was attained with commercial enzymes (87% and 47%, respectively), SF cellulases adsorbed around 80% of the loaded protein having a conversion of 17%. Even tough, SmF showed a protein adsorption of 77% the sugar conversion yields were around 3%. Fourier transformed infrared spectroscopy complemented this study supporting carbohydrates degradation with the different cellulases complex.

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