

**Hydrolysis of sugarcane bagasse by oxalic acid catalysed
process for ethanol production by *Pichia stipitis* NRRL Y-7124**
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Abstract

Sugarcane bagasse (SB) is the suitable lignocellulosic feedstock for long term sustainable ethanol production in tropical countries of the world. In the present study, we evaluated the efficacy of oxalic acid (OA) pretreatment of SB, which resulted into maximum hemicellulosics degradation into xylose rich hydrolysate (27.50 g/l total reducing sugars). This hydrolysate was accompanied with the fermentation inhibitors such as total phenolics (2.5 g/L) and acetic acid (1.47 g/L). The remaining cellulosic fraction was enzymatically digested using cellulolytic enzymes (20 FPU g of Celluclast 15 L and 25 U/g of Novozyme 188). Preliminary results from enzymatic hydrolysis showed (22 g/l sugars) after 48h of reaction at 50 °C and 150 rpm.

The acidic hydrolysate was detoxified by calcium hydroxide overliming prior to the ethanol fermentation. Both the hydrolysates (detoxified acid hydrolysates and enzymatic) were separately fermented for ethanol production by *Pichia stipitis* NRRL Y-7124. Detoxified hemicellulosic hydrolysate and enzymatic hydrolysates produced maximum ethanol production (13.45 g/l, yield 0.48 g/g) and (9.15 g/l, yield 0.416 g/g) respectively after 48 h of incubation. Effect of OA pretreatment and enzymatic hydrolysis on the structural changes was confirmed by Scanning electron microscopy. The impact of OA pretreatment on SB, enzymatic hydrolysis, ethanol fermentation and the structural analysis will be discussed in presentation.

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