

183e Fermentation of Pretreated Corn Stover Hydrolysate

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Mid-severity dilute acid pretreatment liquor from Kramer corn stover pretreated in the Sunds reactor at NREL was analyzed, conditioned, and fermented by glucose/xylose co-fermenting yeast (*S. cerevisiae* 424A(LNH-ST)). This yeast is currently being validated for large scale industrial cellulosic ethanol production. The pretreatment hydrolysate liquid contained 22.4 to 24.6 g/L glucose, 72.7 to 76.2 g/L xylose, 13 g/L acetic acid, 2.1 g/L furfural and 2.7 g/L HMF, and was conditioned by over-liming, contact with polymeric (XAD-4 resin), or a combination of the two steps before fermentation. The sugar compositions were similar to those for the untreated hydrolysate, although in all cases a significant fraction of the furfural was removed, and in the case of overliming, some HMF was also removed. XAD4 has been previously been shown to selectively remove furfural and color from the aqueous sugar solutions. *S. cerevisiae* 424A (LNH-ST) completes the fermentation in 48 hours for media containing the same amounts of pure sugars as are found in the hydrolysates. However, high salt and acetic acid concentration in the dilute acid pretreatment liquor, and/or residual HMF, is known to decrease the fermentation rate, and this was found to be the case here as well. When the different solutions were fermented by 424A (LNH-ST), glucose was consumed in 2 to 6 hours, but only 40% of the xylose was fermented to ethanol within 72 hours as compared to complete fermentation in 48 hours in the synthetic and other media. Research is continuing to optimize conditions and enhance rates and extents of ethanol fermentation from xylose in hydrolysates obtained from acid pretreated cornstover.