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## **Hydrolysates Produced from NABC Feedstocks**

A primary goal of both the Fermentation of Lignocellulosic Sugars (FLS) and Catalytic Conversion of Lignocellulosic Sugars (CLS) process strategies is to demonstrate proof of concept for hydrocarbon fuel production from biomass during Stage I of the NABC research effort. To accomplish this important goal, the FLS and CLS lead organizations, Amyris and Virent respectively, have been working with the National Renewable Energy Laboratory (NREL) and Washington State University (WSU) to convert the two NABC feedstocks (final harvest residual chips, composed primarily of loblolly pine, and corn stover) to a form suitable for conversion to hydrocarbon fuels by FLS and CLS processes.

NREL utilized a dilute acid pretreatment followed by enzymatic hydrolysis, whereas WSU utilized a wet oxidation pretreatment followed by enzymatic hydrolysis, to produce hydrolysates for testing. Additionally, Pall has been providing separation expertise and testing for selective removal of contaminants or other compounds present in the hydrolysate that could cause problems in the conversion process.

Eventually, it is likely that different process conditions for pretreatment and enzymatic hydrolysis will be desired for the two strategies based on differences in the nature of the biomass intermediates desired for these two processes. However, for the first stage of testing it was decided to use the same conditions for producing hydrolysates for both process strategies to establish a common baseline.

Due to structural as well as chemical differences between the two selected feedstocks such as higher lignin content in the woody feedstock, different pretreatment and enzymatic hydrolysis conditions were required for each to ensure good conversion of the hemicellulose and cellulose. At NREL, a wide range of dilute acid pretreatment conditions were selected for both feedstocks in order to provide hydrolysates that contained different relative amounts of soluble biomass deconstruction compounds. Pretreatment and enzymatic hydrolysis operations were conducted at high solids concentrations in order to generate hydrolysates with high soluble product concentrations.

Several kilograms of pretreated and enzymatically saccharified hydrolysate from both corn stover and pine were provided to Amyris and Virent for hydrocarbon fuels conversion using their respective conversion processes. Additional hydrolysate was also supplied to Pall for separations testing and to evaluate techniques for selective removal of potential contaminants.

Additional hydrolysates will be generated and provided using modified pretreatment and enzymatic hydrolysis conditions for both the FLS and CLS process strategies as warranted based upon the preliminary hydrocarbon fuels conversion results.