**Process design and analysis of lignocellulosic biomass to biofuel using the renewable solvent γ-valerolactone (GVL)**

A recent breakthrough in lignocellulosic biomass deconstruction at Great Lakes Bioenergy Research Center utilizes γ-valerolactone (GVL), a renewable solvent that can be derived from the biomass itself. In a recent publication researchers at GLBRC designed a process for large-scale production of ethanol from lignocellulosic biomass that employs GVL for biomass deconstruction. The authors of the study then performed technoeconomic and sensitivity analyses of the GVL process to identify the major cost and technoeconomic drivers for process improvement. In the scenario outlined, various separation systems are used to obtain high yields of C5 and C6 sugars as well as lignin. The sugars are then fermented to ethanol by yeast whereas the lignin is burned for heat and electricity. The GVL process appears to be competitive with other biofuel production strategies, with the ethanol selling at a minimum of ~$5 per gallon of gasoline equivalent. A key parameter for future optimization is the solvent:biomass ratio. Lowering this ratio will make the process more energy and cost efficient and thus, future research efforts should focus on this key step.

**References:** Han, J., Luterbacher, J.S., Alonso, D.M., Dumesic, J.A., Maravelias, C.T., 2015. A lignocellulosic ethanol strategy via nonenzymatic sugar production: process synthesis and analysis. BioresourceTechnology 182, 258-266.

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