## Profile of David Thompson

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| Paper No. | Paper Details | Presenter |
|---|---|---|
| PO62 | **Yield stress and flow behavior of enzyme liquefied slurries from corn cobs and corn stover pellets**<br>Diana M. Ramirez Gutierrez, Antonio J. Gonçalves da Cruz, Carlos A. Torres Cañizares, Xueli Chen, Rosineide Gomes da Silva Cruz, Luana Serra, Ria D. Corder, Nathan Mosier, David Thompson, John Aston, James Dooley, Pankaj Sharma, João R. M Almeida, Kendra A. Erk, Eduardo Ximenes and Michael R. Ladisch<br>**Wednesday 6:30 Riverwalk A (Poster Session)**<br>With the increase in population, the world will depend on renewable sources to meet the increasing energy needs. The use of lignocellulosic biomass as a renewable source has been proven efficient for conversion to cellulosic ethanol and capable of contributing to thresholds for energy demand while reducing greenhouse gases by 90% when compared with fossil fuels. However, limitations in feeding and flow within biorefineries is encountered when system plugging occurs due to biomass compaction and a high yield stress for slurries formed during its processing, thereby preventing transport of biomass materials between plant unit operations. In some cases, this leads to unexpected plant shutdowns increasing industrial operational costs. As an alternative, enzyme-assisted liquefaction for slurry creation from corn stover at solids loadings up to 30% is reported in this work. Two different kinds of biomass (pelleted corn stover and cobs) were liquefied in a fed-batch process using commercial enzymes Celluclast 1.5L or Ctec-2 at 1FPU or 3 FPU per gram of dry solids in 10 mM sodium citrate buffer solution (pH 4.8). Pellets were fed into a 1 L stirred bioreactor according to a pre-defined fed-batch protocol over the first 5 hours until reaching 30% of solids loading. After 6, 24 and 96 hours, samples were taken and characterized with respect to their sugar composition, rheology and water absorption. Successful slurry creation with dramatically reduced yield stress was achieved for corn stover for both assessed enzymes. Yield stresses of 178±7 Pa (3 FPU, Celluclast 1.5L) and 79±6 Pa (3 FPU, Ctec-2) were measured for corn stover at 24 hours, compared to 6,000 Pa for samples without enzyme. Yield stress was 155± 29 Pa (3FPU, Ctec-2) and 257 ± 72 Pa (1 FPU, Celluclast 1.5L) for corn cobs at 24 hours. Yield stress decreased when residence time increased with an enhanced fluidity noted for higher enzyme concentrations. A profile for 6, 24 and 96h of yield stress measurements is presented. | N |