



6-3 - Challenges and Advances in Aqueous Processing of Corn Stover Pellets into High Concentration Slurries

 Tuesday, May 2, 2023

 9:00 AM - 9:30 AM

 Pavilion East (Plaza Level, Hilton Portland Downtown)

Abstract

Significant progress has occurred in developing combined enzyme hydrolysis and fermentation technologies for transforming lignocellulosic feedstocks into ethanol and other bioproducts. Various routes described in the literature show that low carbon footprint processes efficiently convert the cellulose and hemicellulose fractions of pretreated corn stover, wood chips, and sugarcane bagasse to sugars and to ethanol. Combinations of different pretreatments at high or low pH or in liquid hot water, followed by enzyme hydrolysis and fermentation or direct conversion of cellulose to ethanol (i.e., by consolidated bioprocessing) have been demonstrated. These successes have brought the need to preparing the feedstock – before it enters the biorefinery – into focus. This paper summarizes recent developments in liquefying corn stover, before pretreatment, so that slurries with yield stresses below 200 Pa are obtained and a “pumpable” corn stover slurry results at initial solids loadings of up to 300 g/L. The manner in which corn stover pellets are combined with water and enzyme in an agitated bioreactor is described, and properties that define slurry behavior are presented. Implications on biorefinery operations are explained in terms of particle properties and the preprocessing of corn stover as well as the team approach used to obtain these results.

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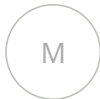
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