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Integrated C5-based biorefinery for the production of high energy density biofuels and biochemicals

Hemicellulose based sugars (e.g., xylose and arabinose) can be a platform for synthesis of a variety of high energy density fuels currently derived from petroleum. Pentoses were identified by the US Department of Energy in 2004 among the top candidates of valuable chemical precursors that could be produced from biomass. University of Louisville has developed and demonstrated an integrated C5-based biorefinery concept. In this concept, we start with a hemicellulose rich "captive" agricultural biomass and selectively extract C5 sugars. Some examples of such hemicellulose rich biomass are: soy hulls from soybean processing, rice hulls from rice milling, corn fiber from wet milling or dry milling, bagasse from sugarcane processing, etc. One of the key process steps of this biorefining concept is a precipitation protocol that delivers D-xylose in pyranose form to obtain a pure starting monosaccharide. The C5 sugars derived from these co-products can be converted via chemical synthesis routes to higher-value bio-jet fuels and high energy density components of bio-jet fuels.

Biography

Jagannadh Satyavolu works as Theme Leader, Biomass conversion and Biofuels, Conn Center for Renewable Energy Research, University of Louisville, Louisville, KY.Dr. Satyavolu earned his PhD in Chemical Engineering from the Ohio State University, Columbus, OH and has 30 years of experience in commercial business leadership roles, operations and capital project management, intellectual asset development and management, product and process technology development, industrial application research, and academia. He holds 20 US and international patents and has steered multiple projects from concept to commercialization. Prior to joining Conn Center, he worked at Cargill, Georgia Institute of Technology, Battelle Labs, and the Ohio State University.

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