Pilot Integrated Cellulosic Biorefinery Operations to Fuel Ethanol

ICM will modify an existing pilot plant to use their biochemical conversion technology to produce fuel-grade ethanol from corn fiber, switchgrass, and energy sorghum

ICM will leverage its existing pilot plant located at LifeLine Foods' existing dry fractionation grain-to-ethanol plant in St. Joseph, Missouri. Co-locating the cellulosic biorefinery with the existing grain-to-ethanol pilot facility will accelerate pilot operations and improve the economics of the process. The Integrated Biorefinery will process 10 bone-dry tons per day of feedstock into ethanol.

Project Description

ICM will operate the pilot cellulosic integrated biorefinery using a biochemical platform pretreatment and enzymatic hydrolysis technology coupled with a robust C5/C6 co-fermenting organism to refine cellulosic biomass into fuel ethanol and co-products. The proposed process addresses pretreatment, hydrolysis, fermentation, and feed production which represent key technologies needed for the cost effective production of ethanol from cellulosic biomass. ICM plans to use energy sorghum and switchgrass to evaluate the advantages of an integrated cellulosic/starch biorefinery against a standalone cellulosic biorefinery. ICM plans to evaluate two separate fermentation strategies that ferment both C5 and C6 sugars resulting from lignocellulose hydrolysis. These different strategies can produce both high titer cellulosic ethanol for reduced capital and operating costs as well as significant volumes of animal feed.

Small-scale aerobic fermentation equipment in starch pilot plant

Large-scale anaerobic fermentation and liquefaction equipment in starch pilot plant

Potential Impacts

In addition to creating an economically efficient model for future biorefineries, the biobased substitutes generated by this facility have the potential to reduce Greenhouse Gases (GHG) by 55% when compared to petroleum based products, and displace imported oil currently used to make commercial fibers, solvents and fuel additives. The intent is to help move the U.S. closer towards petroleum independence and reduce emissions of greenhouse gases. In addition, over 70 permanent and temporary jobs will be created as a result of this project.

Other Participants

ICM has teamed with Novozymes and others to make this scope of work possible.

Prime	ICM, Inc.
Location	Colwich, KS (Offices) St. Joseph, Missouri (project)
Feedstock (s)	Corn Fiber, Switchgrass, and Energy Sorghum
Size	10 Tons per day
Primary Products	Ethanol
Capacity	245,000 GY fuel or product
Award Date	January, 2010
GHG Reduction	55% reduction versus fossil product
Anticipated Job Creation	21 sustained jobs will be created by this project and another 50 temporary jobs will be created during peak construction
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