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7. Title

A Louisiana Sugar Mill Based Biorefinery Utilizing Energy Crops for the Production of Fermentation Ethanol and By-Products

12. Investigator Name(s) (Last Name and Initials)

Day, D. F.

20. Termination Date 12/31/2013	40. Period Covered (mo/da/year): 01/01/2011 TO 12/31/2011

Outputs:

During 2011 there were two refereed publications and two non-refereed publications, and five abstracts (presentations at meetings) published under the auspices of this project.

Outcomes/Impacts:

The goal of this program is to lay a foundation for crop utilization with staggered harvest times in a biorefinery. Four crops (algae, sweet sorghum, energycane and sugarcane bagasse) were considered at the start of this program from biofuel (butanol) production at a raw sugar mill. Wild algae, native to Louisiana, was not feasible as a crop at this time. Partition and composition studies were conducted on sweet sorghum and energycane. This work was conducted in collaboration with LSU Southeast Regional Station and the USDA-ARS, Sugarcane Research Laboratory at Houma, LA. An economic analysis indicates that fermentable sugars can be produced from these crops at a price comparable to the current selling price for sugars in blackstrap molasses. Butanol was chosen as a target for production from the fermentable sugars produced in these crops. A continuous immobilized cell column for producing butanol was constructed and being optimized for flow rates, temperatures using a synthetic glucose based feedstock. The project is shifting to production using blackstrap molasses and cellulosic hydrolysates from the above crops. Liquid-liquid extractants are being to reduce the cost of butanol productions.

Publications:

Madsen, L. R. and D. F. Day. 2011. Iron mediated clarification and decolorization of sugarcane juice. International Sugar J. 113:335-342.

Kim, Misook and Donal F. Day. 2011. Composition of Multiple Feedstocks Suitable for Ethanol Production at Louisiana Sugar mills. J. of Industrial Microbiology and Biotechnology 38:803-807.

Madsen, L. and D. Day. 2011. The negative potential impact of starch in the sugar factory. Audubon Sugar Institute Factory Operations Seminar, April 19, pp 49-56.

Day, D. 2011. Biorefinery development using multiple feedstocks. Audubon Sugar Institute Factory Operations Seminar, April 19, pp 59-64.

Participants:

Donal Day (PI), L. Madsen, M. Kim, Y. Moon, K-J Han, E. Richard, G. Aita, V. Kochergin, A. Hoogewind, and Christian Lohney, LSU AgCenter

Target Audiences:

Specific target audiences are sugarcane producers, processors and land owners and industries and businesses interested in producing biofuels in Louisiana along with the State Office of Economic Development.

No major changes in the approach were needed or anticipated for the coming year.

Approved (Signature)	Title	Date