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LBL Publications

Title

Production of C5 Hydrocarbons from Water Biomass

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LBNL Report Number _____

OSTI Number _____

1. Parties: Visolis Inc.
2. Title of the Project: Production of C5 Hydrocarbons from Water Biomass
3. Summary of the specific research and project accomplishments:

Researchers at the Advanced Biofuels Process Development Unit (ABPDU) collaborated with Visolis to demonstrate and validate production of isoprene from volatile fatty acids present in wet waste via biochemical conversion. Biochemical isoprene production required development of new environmental health and safety protocols, as well as development of analytical techniques for real-time monitoring of isoprene volatilization from the fermenters. A new WPC activity for isoprene fermentation was developed and approved as part of this CRADA. In addition, ABPDU researchers developed a method for quantification of isoprene in fermenter offgas. Unfortunately, the sensitivity of the gas analyzer employed for isoprene detection was too low to effectively quantify isoprene at the quantities produced during fermentation. For this reason, the fermentation work was ultimately completed at Visolis facilities.

4. Deliverables:

Deliverables met	Party (LBNL, Participant, Both)	Delivered to Other Party?
Technology transfer materials provided for microbial isoprene production process	Visolis	Yes

WPC activity for isoprene fermentation created and approved	LBNL	Yes
Method developed for isoprene quantification in fermenter offgas	LBNL	Yes

5. Identify publications or presentations at conferences directly related to the CRADA?

N/A

6. List of Subject Inventions and software developed under the CRADA:

N/A

7. A final abstract suitable for public release:

ABPDU researchers collaborated with Visolis for demonstration of a new process for biochemical upgrading of wet waste feedstocks to C5 hydrocarbons. Technology transfer, safety assessments, and analytical method development were completed at ABPDU. Ultimately, due to analytical sensitivity challenges at ABPDU, the fermentation process demonstration was completed at Visolis facilities.

8. Benefits to DOE, LBNL, Participant and/or the U.S. economy.

While LBNL was ultimately unable to complete isoprene fermentations on-site, Visolis was able to complete the process off-site, demonstrating the feasibility of wet waste conversion to higher value, highly reduced products. At LBNL, the WPC activity created for this work has since been modified for additional fermentation involving toxic or flammable compounds in fermentor offgas, thereby expanding the suite of fermentation capabilities at ABPDU. In addition, this work highlighted gas analysis as a key gap in ABPDU capabilities. We are currently awaiting delivery of a new gas analyzer with an electron multiplier, which will enable detection of volatiles in fermentor offgas at ppm levels.

9. Financial Contributions to the CRADA:

DOE Funding to LBNL	\$ 0.00
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Participant Funding to LBNL	\$ 25,000.00
Participant In-Kind Contribution Value	\$ 124,386.00
Total of all Contributions	\$ 149,386.00

* *“Proprietary Information” means information, including data, which is developed at private expense outside of this CRADA, is marked as Proprietary Information, and embodies (i) trade secrets or (ii) commercial or financial information which is privileged or confidential under the Freedom of Information Act (5 U.S.C. 552 (b)(4)).*