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BIOFORMING
news



VIRENT IS REPLACING CRUDE OIL, CREATING FUELS AND CHEMICALS FROM NATURALLY OCCURRING, 100% RENEWABLE RESOURCES.

VIRENT AND RENMATIX ANNOUNCE COLLABORATION

Last December, Virent and Renmatix announced a strategic collaboration to convert affordable cellulosic sugars to renewable chemicals and bio-based packaging materials. Under the terms of the multi-phase development project, Renmatix's Plantrose™ platform will be evaluated and potentially optimized to provide an affordable sugar stream for Virent's BioForming® process for the large-scale production of bio-based paraxylene.

Renmatix's Plantrose™ process produces affordable cellulosic sugars as the bridge between upstream biomass and downstream plant-based chemicals. An alternative to current petro-based materials, Renmatix's C5 (xylose) and C6 (glucose) Plantro® sugars are produced by an advanced water-based method known as supercritical hydrolysis.

"The potential of combining Renmatix's innovative cellulosic feedstock technology with Virent's bio-based paraxylene process offers a promising pathway for further realizing our PlantBottle® packaging goals,"

said Scott Vitters, General Manager, PlantBottle Packaging Innovation Platform.

"The market growth for sustainable products will be met by innovative technologies working in partnership with the world's leading brands" said Lee Edwards, CEO of Virent. "The joint collaboration announced between Virent and Renmatix in support of Coca-Cola's PlantBottle goals demonstrates the promise of this vision. Together we aim to accelerate delivery of commercial volumes of renewable chemicals by integrating our world class technologies to achieve lower costs and higher efficiency from sustainable biomass based feedstocks."

To date, Virent and Renmatix have successfully completed Phase I of the collaboration and are in discussions on a potential Phase II.



LEE EDWARDS, CEO

VIRENT COMPLETES PHASE I OF BIOMASS TO DISTILLATES PROGRAM

In August of 2011, Virent, National Renewable Laboratory (NREL) and Northwestern University began working on a government funded project, which was given the name of “Blackbird.” Blackbird is one of three government projects Virent is working on. The goal of this project is to integrate Virent’s BioForming® process with NREL’s biomass deconstruction technology to efficiently produce cost effective “drop-in” fuels from corn stover, with a particular focus in maximizing jet fuel yields.

Virent completed Phase I of the project last month. The objective of Phase I was to explore initial integration and process improvement. As part of this work, Virent was able to develop a next generation catalyst that showed increased resistance to deconstruction chemicals, a 20% improvement of selectivity to jet fuel and an overall cost reduction of 20% per gallon of fuel.

In February, Virent and NREL presented the project and a business case for producing bio-jet fuel from corn stover to the Department of Energy (DOE) and a panel of industry experts in Denver. The team also presented a proposed Phase II work plan building off of the success of Phase I. Virent is expecting to receive positive feedback from the DOE later this month regarding a decision to proceed into the second phase of the project. Work in the second phase of the project will focus on continued optimization of the stover to jet fuel technology in key areas to maximize yields and lower overall costs.

TAKE THE QUIZ! HOW WELL DO YOU KNOW VIRENT?

1. What year was Virent founded?

- A) 2008
- B) 2002
- C) 2004
- D) 2009

2. Virent has two demonstration plants. What names have we given them?

- A) Eagle and Phoenix
- B) Blackbird and Mini-Distillate
- C) Eagle and Mini-Distillate
- D) Phoenix and Nighthawk

3. What was Virent’s main focus when the company was formed?

- A) Hydrogen
- B) Ethanol
- C) Bio-based fuels
- D) Bio-based chemicals for cosmetics

4. How did Virent get its name?

- A) It combines the last names of two of our earliest investors
- B) It means “green” in Latin
- C) It’s a chemistry term Dr. Randy Cortright often used in lab at the university that stuck
- D) Its named after a body of water that ran through Dr. Randy Cortright’s backyard of his childhood home

5. What are the benefits of Virent’s technology?

- A) Its products are “drop-in”
- B) Its technology can be deployed globally
- C) Its technology is feedstock flexible, meaning that it can utilize a wide variety of cellulosic and noncellulosic feedstocks
- D) All of the above

6. Virent’s process to produce aromatics from Brazilian sugarcane has been shown to reduce greenhouse gas emissions by what percent?

- A) 10%
- B) 30%
- C) 15%
- D) 55%

7. Virent’s core technology was invented and patented where and by who?

- A) Northwestern University, Dr. Randy Cortright and Dr. James Dumesic
- B) The University of Wisconsin, Lee Edwards
- C) The University of Wisconsin—Milwaukee, Lee Edwards
- D) The University of Wisconsin, Dr. Randy Cortright and Dr. James Dumesic

8. Virent’s corporate partners include:

- A) Coca-Cola, Honda, GM, Cargill
- B) Shell, Honda, Cargill, Coca-Cola
- C) BP, Coca-Cola, Honda, Cargill
- D) Toyota, BP, Honda, Cargill

9. Virent has a partnership in place with The Coca-Cola Company to commercialize which bio-based chemical?

- A) Paraxylene
- B) Benzene
- C) Mono-ethylene Glycol
- D) Isobutanol

10. What technology does Virent utilize for biomass conversion?

- A) Catalysis
- B) Fermentation
- C) Gasification
- D) Pyrolysis

Find out how you did on the next page!

VIRENT CELEBRATES WINNING 2013 ICIS AWARD IN LONDON

As you may recall, last October Virent was awarded the 2013 ICIS Chemical Business Innovation Award, winning the Best Sustainability Innovation category for the development of our process that converts plant sugars into paraxylene for renewable, recyclable packaging and fibers. To celebrate and congratulate the winners of the 2013 ICIS Innovation awards, ICIS hosted a luncheon in London last December. Below is a picture of David Hitchcock with Renmatix technical fellow, Charles Sanderson.



MEET EMPLOYEE PAT SMITH

Pat Smith has been Virent's Administrative Coordinator for five years, answering the phone, greeting visitors with a cheerful smile and completing many miscellaneous administrative projects for people in all departments throughout the company. When asked what she enjoys most about her time at Virent so far, her answer was not too different from that of others; the people. "Sitting at the front desk allows me to work with different people and personalities in all areas of the company. I enjoy being able to interact with and get to know everyone" Pat says.

Pat has held many roles before joining Virent, such as a hairdresser, teacher's aide, assistant to a family owned funeral home, order processor and other front desk positions. Like most Wisconsinites, Pat loves Wisconsin summers where she spends time outdoors gardening. She also enjoys decorating and spending time with her six year old granddaughter, Madeline and is looking



forward to visiting her son in San Diego this March. A fun fact about Pat is that she'd love to get her pilot's license someday.

NEW FARM BILL A WIN FOR BIOFUEL AND BIOCHEMICAL COMPANIES

On February 7th, President Obama signed the new Farm Bill into law, a measure that sets U.S. agricultural policy for the next five years. The bill reforms areas including farm policy and food stamps, but what Virent considers the biggest win is a provision made under the Energy Title to expand the Biorefinery Assistance Program to include renewable chemicals and other biobased products. Now, under the Biorefinery Assistance Program, companies that manufacture biobased products from renewable chemical building blocks can also compete for loan guarantees.

In addition, the Energy Title will receive \$879 million in new money over ten years to invest in renewable energy and energy efficient programs on farms and rural communities. Policies such as the RFS and the Farm Bill Energy Title provide policy stability that will help attract new private investment capital. The Biorefinery Assistance Program may be a funding opportunity as Virent moves towards commercialization of its bio-based paraxylene.

ANSWERS TO THE VIRENT QUIZ!

HOW WELL DID YOU DO?

1. B; 2. C; 3. A; 4. B; 5. D; 6. D; 7. D; 8. B; 9. A; 10. A

VIRENT ON THE ROAD

March 4-6
June 3-4

World Bio Markets
World Biofuels Conference

Amsterdam, The Netherlands
Seville, Spain

Virent presents around the world at a wide variety of events, and our annual calendar is kept up-to-date on the [events area of our website](#).