Request for Information (RFI) DE-FOA-0001615: Cellulosic Sugar and Lignin Production Capabilities

Description: The U.S. Department of Energy (DOE) seeks input from industry, academia, national laboratories and other biofuels and bioproducts stakeholders to identify existing capabilities to produce lignocellulosic sugars and lignin for use by the research community.

Purpose: The purpose of this RFI is to develop a comprehensive list of suppliers who are willing and able to produce and sell cellulosic sugar and/or lignin for use by the research community.

Request for Information Response Guidelines
Responses to this RFI must be submitted electronically to **sugarandlignin@ee.doe.gov** no later than 5:00pm (ET) on August 24, 2016. Responses must be provided as attachments to an email. It is recommended that attachments with file sizes exceeding 25MB be compressed (i.e.,zipped) to ensure message delivery. Responses must be provided as a Microsoft Word (.docx) attachment to the email, and no more than 5 pages in length, 12 point font, 1 inch margins.

Request for Information Categories and Questions

- Company / institution name: FPInnovations
- Company / institution contact: Zhirun Yuan
- Contact's address, phone number, and e-mail address.

570 Boul. St-Jean, Pointe-Claire, QC, Canada, H9R 3J9

514-7824661

Zhirun.yuan@fpinnovations.ca

About TMP-Bio technology:

The TMP-Bio technology developed by FPInnovations converts wood chips to a sugar stream and a hydrolysis lignin (H-Lignin) stream. Compared to existing pulping processes that convert wood chips to paper-making pulps, no pulp is produced in this process. As a result, it is not an add-on addition to an existing pulp mill, which would be at risk of closure if the pulp mill closed; it is a standalone process that does not rely on the existence of an existing pulp mill to continue production. (It will, however, benefit from co-locating with an existing pulp mill to share access to utilities such as effluent treatment, steam and power, wood handling and shipping logistics, etc.).

Compared with existing biomass to sugar processes, TMP-Bio includes a pretreatment stage that produces a biomass stream that is easily hydrolysed to clean, fermentable sugars. This is due to a unique combination of mechanical action and mild chemical treatment, both of which limit the generation of inhibitors such as acetic acid, furfural or others. Finally, the mild conditions lead to a sulfur-free, high-quality, light colored H-lignin co-product which is close to native lignin in terms of chemical structure.

Category 2: Lignin

HYDROLYSIS LIGNIN (H-LIGNIN)

Question 1: To which types of research entities are you willing and able to sell or otherwise provide your lignin? (e.g., university researchers, national laboratories, industry/private sector)? Are there any types of research entities to whom you are not willing and able to sell your lignin?

- Samples available to partners on a case by case basis, with a Material Transfer Agreement

Question 2: What are the maximum and minimum quantities of lignin that you are willing and able to sell (kg)?

- Samples up to 100 kg available

Question 3: In what units do you sell your lignin and is it packaged (e.g., super sacks), or sold in bulk?

- Flexible / depends on quantity, samples in boxes, pails or barrels

Question 4: How do you ship lignin?

- Conventional courier or postal service for small samples, freight company for larger samples

Question 5: What is the lignin concentration in your product?

- As requested

Question 6: What type(s) of biomass do you use in your process?

- Currently hardwood species

Question 7: What process do you use that produces lignin (dilute acid, ammonium fiber expansion (AFEX), hot water, organosolv, etc.)?

- TMP-Bio process – FPInnovations' proprietary technology

Question 8: What details of the scale of your process are you willing to share (e.g. batch and/or continuous or volumetric productivity)?

- Pilot scale quantities

Question 9: Do you measure the typical composition of your lignin? If so, what method

do you use? How consistent is the composition of your lignin?

- Klason lignin and carbohydrate contents are routinely monitored. Quality is quite consistent.

Question 10: Do you routinely test your lignin for consistency within and between lots?

- Yes

Question 11: What impurities are present in your lignin and what testing do you perform to determine the presence of impurities?

- Ash content is primary test for purity; typically <1%
- ~2% of protein is usually present

Question 12: Does your process include a purification or filtration step?

- There is a filtration step. Washing step can be added; but no further purification step is used.

Question 13: What is the typical concentration in g/L you can provide?

Question 14: Have you examined the impacts of transport and storage on lignin? If so, can you please provide any relevant (non-proprietary) details of these impacts?

- Wet non-washed H-lignin should be frozen stored due to the presence of the free sugar. Dry H-lignin is very stable in sealed storage.

Question 15: What additional information are you willing and able to provide to the research community about the lignin? Please provide any non-proprietary cost information you are willing to share.

- H-lignin from TMP-bio process is a near native lignin. It is sulfur-free, very light colored, and has no odor.

Question 16: Into what markets do you typically sell your lignin? What is a typical application for your lignin?