

## UMaine Response to Request for Information Categories and Questions

**Company / institution name; University of Maine, Forest Bioproducts Research Institute (FBRI)**

**Company / institution contact; Dr. Hemant Pendse, Director FBRI**

**Contact's address, phone number, and e-mail address.**

**5737 Jenness Hall, Room 115, Orono, ME 04469**

**1-207-581-2290**

**pendse@maine.edu**

### **Category 2: Lignin**

Lignin is often classified differently depending on who produces it, how it is produced and for which specific market it is intended. Agriculture, for example, typically looks at acid soluble and non-digestible fiber (NDF) lignin while the pulp and paper industry typically looks at Klason, Kraft, and acid detergent lignin. BETO is interested in information related to all types of lignin available to the research community to provide the most comprehensive set of data.

If you currently operate a facility that produces lignin that you are willing and able to sell or otherwise make available to the research community, please provide information in response to the following questions. You may respond to as many or as few questions as you wish. The questions are intended to provide the research community with useful information when looking for a supplier of lignin. **BETO is requesting NON-PROPRIETARY information only.**

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?

**Answer: We sell to all customers with proper non-disclosure agreements and material transfer agreements.**

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

**Answer: 100 g up to 1 kg dry lignin**

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

**Answer: The lignin would be sold in 100 g units**

Question 4: How do you ship lignin?

**Answer: By Fed Ex**

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

**Answer: 95-100%**

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

Answer: Wood, straw, any lignocellulosic material

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

Answer: Organosolv, kraft, dilute formic acid

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

Answer: Batch operation 20 L Parr Reactor, 100 L Batch Digester

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?

Answer: Lignin produced upon request, composition can be measured by UV absorption, Klason analysis, CHON analysis, ash content, sodium and sulfur content, Molecular weight distribution, NMR

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

Answer: Lignin is produced upon request, not produced on a routine basis.

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

Answer: Could be ash or hemicellulose sugars. For analysis see question 9.

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

Answer: Yes, includes washing and filtration.

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

Answer: Dry solid

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?

Answer: No, but stored as a dry solid

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.

Answer: Information provided to customers with proper non-disclosure agreements and material transfer agreements.

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

Answer: Sold for research purposes.