

U.S. DEPARTMENT OF ENERGY  
REQUEST FOR INFORMATION (RFI) / DE-FOA-0001615  
CELLULOSIC SUGAR AND LIGNIN PRODUCTION CAPABILITIES

Clariant Group Biotechnology

Contact: Martin Mitchell / Business Development Manager, Americas

Phone: +1 515 699 8518

Email: martin.mitchell@clariant.com

Headquarters

Clariant Produkte (Deutschland) GmbH

Semmelweisstraße 1

82152 Planegg, Germany

Category 2: Lignin

*Question #1 - To which types of research entities are you willing and able to sell your 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?*

Clariant is willing and able to sell lignin to the university, national labs and industry/private sector upon understanding from the customer for what purpose the lignin will be used for. Clariant is not willing to provide lignin for competitors developing their own lignocellulosic conversion technology.

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

Clariant can provide quantities starting from kg up to several tons.

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

We can deliver lignin in bulk quantity.

*Question #4 – How do you ship lignin?*

Depending on the location we can ship lignin e.g. in IBC containers, big bags or regular containers. Cooled or frozen shipment is also possible.

*Question #5 – What is the lignin concentration in your product?*

The lignin out of the process has naturally a moisture content of ~40-50%.

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

Clariant is flexible on the biomass source, so this depends on the needs and requests from the customer. The Clariant conversion technology (called sunliquid®) has been optimized for commercial production of lignocellulosic sugars and also lignin using agricultural residues such as corn stover, wheat straw, sugarcane bagasse and straw, barley straw, rice straw and others. However, Clariant has tested over 25 different biomass feedstock in the past at different scales of production.

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

Clariant uses the same process as cellulosic sugar production to produce lignin. It utilizes a chemical-free steam explosion pre-treatment technology with enzymatic hydrolysis using Clariant proprietary optimized enzymes solutions. Following the solid-liquid separation after hydrolysis step, the lignin is obtained as side stream.

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

The lignin is produced in a batch mode using filter press.

*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?*

Yes. We routinely test the composition of lignin.

Normally we conduct the fuel characteristic analysis (ash composition, salts, moisture and heating values) and Feedstock Analysis (FSA) analysis for molecular analysis.