Bioenergy Feedstock Library

Cataloging bioenergy feedstock quality, performance data and samples for research and commercial use

The Bioenergy Feedstock Library is an extensive collection of data on biomass feedstock characteristics compiled in an easy-to-access central repository.

Many performance challenges faced by the growing bioenergy industry result from a poor understanding of how variability in biomass characteristics can affect everything from harvest to conversion. To overcome these challenges, researchers and industry need information about the physical, chemical and conversion performance characteristics of the ever-growing number of feedstock options.

The Bioenergy Feedstock Library fills this need by providing an organized, secure resource for biomass feedstock information. Experts at the Biomass Feedstock National User Facility (BFNUF) compile biomass characteristics, such as ash content or composition, in an easy-to-access digital database. The library is fast becoming the most comprehensive, actively managed database of its kind, with sample data for more than 65,000 biomass samples and bioenergy characterization data for more than 20,000 samples.

The library is a living archive continuously updated with new tools and feedstock samples. It is designed to help researchers and industry evaluate feedstock quality characteristics and formulation.

ROLE

The Bioenergy Feedstock Library is more than a storage facility for feedstock information; it's a secure data repository for biomass characterization projects. The library is designed to support research and development that can help solve challenges to using biomass as a large-scale energy resource.

Chief among those challenges is biomass variability — differences in physical or chemical characteristics among biomass samples. Problems resulting from biomass variability range from microbial degradation in storage and plugged conversion processing equipment to potential health hazards and incomplete conversion — all of which increase conversion costs for biofuel and bioenergy producers. With samples representing 90 different crop types and data from well over 100 government, industry and academic institutions, the library is an extensive source of information on biomass variability.

Idaho National Laboratory

Together, the library and BFNUF researchers provide industry with a resource to address challenges at the interface between feedstocks and conversion. BFNUF researchers understand feedstock quality as well as the needs of industry partners. The result is a better understanding of feedstock convertibility and processability.

REMOTE PROJECT MANAGEMENT

The library's remote project management database provides outside researchers with tools to securely manage their own biomass samples from anywhere. Bar code sample management tools and database management interfaces allow researchers to upload, store, edit and track biomass samples, analytical data and sample results. Security controls on each project can limit dissemination of raw data sets while allowing snapshots of important biomass characteristics for external visitors.

PARENT-CHILD TRACKING

It is often important to maintain the relationship of feedstock characteristics from single-source materials and their process intermediates in a hierarchical format through preprocessing and conversion testing. The parent-child tracking feature supports collaborations by allowing researchers to build upon previous analyses and relate their results to the parent sample.

RESEARCH TOOLS

- The Analysis Summary tool shows an overview of the library's analysis results by displaying averages of all analyses performed for each crop type. This allows users to see a breadth of analysis types and feedstocks at a glance.
- Attribute Graphs show the characteristics of various crop types. Users enter the crop type and the analysis type for the desired graph, allowing a look at the variability of analysis results for the given crop type(s).
- The Blend Prediction tool explores the projected characteristics of custom biomass blends. Blend characteristics are estimated by combining characteristics of individual crops, allowing the user to estimate quality parameters of feedstock blends.
- The Least-Cost Formulation tool is a mapping interface that allows users to explore the regional distribution and availability of biomass crops and blends based on cost per ton, harvest radius and harvest year.

The BFNUF library team is continually developing new tools such as the Quality Assurance and Control tool, which allows researchers to compare their own analytical methods and feedstocks to baselines available at the library.

PHYSICAL SAMPLES

The library's Physical Sample Repository houses more than 40,000 samples of biomass representing 90 crop types collected from 40 states. Samples come from projects funded by the Department of Energy's Bioenergy Technologies Office and other contributors.

REFERENCE MATERIALS

The library's physical sample collection includes a number of commercially harvested industrial feedstocks for use as reference materials. These samples are prepared and characterized by BFNUF researchers using standard laboratory procedures. The collection includes crop types such as corn stover and switchgrass, and wood products such as poplar and lodgepole pine.

Researchers compile information for the reference materials into data sheets that provide a snapshot of the physical and chemical characteristics of each sample type.

The data sheets include details about the age, origin and preparation of each sample followed by chemical composition, fuel properties, ash composition and particle characteristics. These materials ensure that researchers have standardized, characterized industrial feedstock resources readily available for their research needs. Researchers may request shipment of these reference materials.

FEEDSTOCK GRADING

BFNUF researchers have worked to devise a standardized feedstock grading system that can aid development of a commercial, commodity-based bioenergy industry.

FUNDING AND SUPPORT

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