Sustainable Chemicals from Biomass

Initiative

Spero Energy, Inc. is developing the next generation cost competitive technologies for the transformation of non-food biomass into high value renewable specialty chemicals to serve domestic and international fragrance and flavor markets. Several Discovery Park programs at the Burton D. Morgan Center for Entrepreneurship have provided support to the Spero team including assistance with market analysis, the identification of customers, education and training on entrepreneurship challenges, the development of a business plan, and advice through the entrepreneurs-in-residence program.

Spero Energy, Inc. is commercializing a proprietary catalytic technology developed in the laboratory of Prof. Mahdi Abu-Omar, the R.B. Wetherill Professor of Chemistry and Chemical Engineering, Purdue University. The initial basic research was supported by C3Bio, a DOE Energy Frontier Research Center. Spero will produce dihydroeugenol and 4-propylsyringol from inexpensive and sustainable non-food biomass. These products and their derivatives eugenol and vanillin have about $1.1 billion global market annually and have applications in fragrances and food flavorings.

Impact

Spero Energy has received $400K assistance funding in 2014 (from federal SBIR grants and State of Indiana matching fund) to advance commercialization of its biomass and lignin conversion technology to produce HVCs. The company also won the 2014 Midwest Clean Energy Challenge competition, sponsored by Boeing, United Airlines and UOP Honeywell, and the Early Venture Company award from Indiana Bio Crossroads. The company will raise $2 million in 2015 to accelerate process scale up and business development. The company estimates that it will be a revenue earning business in 2018.

The benefits of the Spero process are the following: (1) The value of lignin is significantly increased by producing dihydroeugenol and 4-propylsyringol selectively; (2) In a single step digestible cellulose (Spero cellulose) and xylose fractions are coproduced and can be upgraded into renewable fuels and HVCs; and (3) Unlike conventional pretreatments, the Spero process does not consume water. Thus, the present technology improves the economics of current biorefineries by turning lignin into high value chemicals upfront while producing digestible cellulose simultaneously.