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UT Institute of Agriculture awarded nearly \$1 million to study woody biomass feedstock logistics



A team of researchers at the University of Tennessee Institute of Agriculture (UTIA) has been awarded a grant for nearly \$1 million (€0.9 million) to determine the key parameters for high-quality, year-round woody biomass feedstock logistics systems for commercialised biorefineries in the Southeastern United States. The long-term goal of the study is to expedite the pace of developing a commercialised cellulosic biofuel sector by improving the efficiency of the logistics systems of woody biomass feedstock required for biofuel production.

A major component of the US national energy plan is developing diversified sources for liquid transportation fuels, including the development of a robust and sustainable supply of lignocellulosic biomass for a billion-ton US



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bioenergy industry by 2030. However, developing efficient and innovative technologies and strategies to meet national targets while balancing cost and quality of biomass in a logistics system is an ongoing challenge.

The experienced research team will tackle this challenge by using an innovative and integrated approach. While previous studies typically assume a homogeneous feedstock quality when determining the optimal logistics system, this study will determine woody biomass quality in the Southeast and identify the relationship with conversion performance. Additionally, the cost and energy use for woody biomass feedstock size reduction through both conventional and advanced technologies will be obtained at an industrial scale, and the cost and quality of the feedstock will be incorporated to address the challenges of balancing cost and quality in feedstock logistics for scaling up biofuel production.

The study includes the evaluation of alternative preprocessing technologies in feedstock logistics systems for hardwood logging residues and an energy crop — hybrid poplar — to supply biofuel production in the Southeastern region. The US Department of Agriculture and Department of Energy identified the Southeastern US as having great potential for cellulosic biofuel production, which is significant as the portion of woody biomass is projected to increase rapidly by 2030, becoming the major feedstock source of bioenergy.

The research team will model the requirements for a profitable bioenergy sector in the Southeast and provide spatial techno-economic analyses for the costs, quality and relative efficiencies at key points in the hardwood feedstock logistics system for an industrial biofuel system in the region. The study also includes the impact of an established bioenergy sector on the regional economy and the estimated lifecycle greenhouse gas emissions.

The key outcome of the three-year study will be a regional biofuel development plan utilising woody biomass in the Southeast. “Findings from this project will be significant because identifying the technologies and methods to supply reliable and consistent quality of feedstock in a feasible logistics system would expedite the development of the biofuel industry in the region and the nation,” said UTIA associate professor and lead researcher T. Edward Yu. “In addition, a successful bioenergy sector will enhance economic diversification in the rural areas and support a sustainable environment.”

The UTIA multidisciplinary research team includes agricultural economists, forest scientists, chemists, and biosystems engineers, with collaboration from a bioenergy company, Proton Power, Inc., and a biomass research and development company, Forest Concepts, LLC.

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