



Marco Nicovich

MSU 'byproduct' efforts seek new fuel source, chemicals



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Philip Steele, left, loads biomass into the reactor with assistance from senior research associate Eugene Columbus and associate professor of chemical engineering Mark Bricka.

Two complementary Mississippi State research efforts are seeking to capitalize on the energy potential of plant materials called biomass.

A new university project seeks to develop wood preservative systems and fuel from the small-diameter pine trees that traditionally are thinned from larger pine stands.

An MSU team, led by Phil Steele of the Forest and Wildlife Research Center, along with campus colleagues Leonard Ingram and Darrel Nicholas of forest products, Mark Bricka of chemical engineering and Chuck Pittman of chemistry, have a \$1.4 million grant from the U.S. departments of Energy and Agriculture to conduct the project as part of the federal Biomass Research and Development Initiative.

Established to encourage the development of new products from the agricultural and agroforestry sectors, the initiative is intended to "promote the nation's biomass resources, enhance energy security, provide a cleaner environment, and help revitalize America's rural economy," said Energy Department Secretary Spencer Abraham in announcing the initiative.

Lead project investigator Philip H. Steele, an MSU forest products professor, said the project is designed to "establish a novel, technologically advanced approach to developing an environmentally benign wood preservative system from bio-oil with fuel as a byproduct."

BioOil is a condensed gasification product developed by rapid pyrolysis of biomass, usually wood. This condensed BioOil product looks similar to crude oil and can be used for production of chemicals and fuels.

New government restrictions on the use of chromated copper arsenate have created growing demands for a cost-effective, environmentally safe, organic wood preservative suitable for residential applications.

"A BioOil wood preservative would not only fill this critical need but has the potential to boost the forest products industry, which currently has annual sales of preservative-treated wood in excess of \$4 billion," Steele said.

“The production of wood preservatives or BioOil likely would consume about 5 million tons of wood per year with thinnings from Southern pine stands,” he predicted. “This has the potential to provide a critical market to landowners with small-diameter trees.”

MSU research scientists also have concluded that both the BioOil preservative and fuel would diversify the range of products produced from plentiful timber resources, as well as meeting other national needs—including reducing dependency on foreign fuels and improving the nation’s environmental health.

The \$1.4 million grant complements a grant previously received by MSU’s Department of Agricultural and Biological Engineering. This \$1 million U.S. Department of Agriculture grant is a joint effort by MSU and Oklahoma State University known as the Biomass-Based Energy Research project. The Agricultural and Biological Engineering department funded development of the BioOil reactor from this grant. The reactor is based on the design of a collaborating industrial partner, Renewable Oil International, LLC of Florence, Ala.

To consolidate research and development efforts, Mississippi State also has joined the newly created Southern Alliance for the Utilization of Biomass Resources, headquartered at the University of Alabama. Liam Leightley, MSU forest products department head, chairs the collaborative effort.

“Southern rural economies have suffered from the clo-

sure and slowed production rates of pulp mills and the decrease in value of farm crops,” Leightley said. “In the Southeast, we have renewable and expandable sources of energy and chemical feedstocks in the 214 million acres of forestland and the 128 million acres of farmland.”

Bringing together academic institutions from Texas to Virginia, the alliance also includes government organizations, private industries, landowners, and others who will cooperate to capitalize on farm and forest biomass resources.

“By working with nationally recognized researchers at Southeastern universities, the alliance will be able to quickly and efficiently capitalize on biomass conversion projects,” Leightley said.

As a first order of business, the alliance will work closely with state and federal officials on policy development related to the biomass industry. Future plans include educational seminars on the benefits of bio-based energy and chemicals, and assistance in the implementation of new technology and research products.

“Mississippi State is quickly assuming a leadership role in an area that has tremendous economic potential for the South,” Leightley said.

For more on BioOil, telephone Steele at (662) 325-8083; for the Southern Alliance for the Utilization of Biomass Resources, contact Leightley at (662) 325-4444.



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Wood stakes are preserved with BioOil in a treating chamber. After treatment, the wood will be tested to determine how well BioOil protects against decay and insect damage.