



**MISSISSIPPI BIOMASS COUNCIL
BIO BRIEF**

MISSISSIPPI BIOMASS COUNCIL HOSTS FIFTH ANNUAL SOUTHERN BIOPRODUCTS CONFERENCE

The Mississippi Biomass Council (MBC) attracted more than 140 research, industry, and community leaders to the Golden Moon Hotel and Casino in Choctaw, Mississippi for the Fifth Annual Southern Bio-Products Conference on April 3-4, 2006.

The Conference kicked off Monday afternoon with the Choctaw Indian Princess Jessica Greer singing the National Anthem in English and Choctaw, and a welcome by Dr. Lester Spell, Commissioner of the Mississippi Department of Agriculture and Commerce (MDAC). Dr. Spell affirmed MDAC's commitment to biomass research and commercialization, stating, *"It was an honor to attend the southeastern biomass conference where we had a gathering of experts in the field of energy from across the region. It is important for us to focus on new technologies that can create locally developed alternatives to foreign fossil*

fuels on which we have become dependent. Reducing this dependency will provide benefits to Mississippians in the form of jobs and additional value to the landowner."

The welcoming remarks were followed by a general session, highlighting biomass-related activities at the national level. Dr. Lori Perine of the American Forest and Paper Association's Agenda 2020 discussed the integrated forest products biorefinery concept. Dr. Liam Leightley of Mississippi State

woody biomass, sustainable development and the



Conference participants enjoy lunch and catch up on biomass related issues

University addressed energy and chemicals from



Tammi O'Neal explains Eco-Systems and exchanges business cards with Jimmy Mordica of Mississippi Forestry Commission

Jim Wimberly of Bio-Energy Systems outlined the risks and returns of deploying commercial-scale biorefineries and bioenergy facilities in the Mississippi Delta, and Jimmy Mordica, Mississippi Deputy State Forester gave an overview of the recent Mississippi

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Post-Katrina Biomass Summit that was conducted by the Environmental Protection Agency (EPA).

Four break-out sessions were held on April 4th, with two parallel sessions in the morning and two in the afternoon. Sessions and Chairs:

-BioEnergy and Biofuels, Phil Badger of BioEnergy, Inc.

-BioChemicals, Dr. James Rawlins of the University of Southern Mississippi

-Biomass Feedstocks, Drs. Todd French and Rafael Hernandez of Mississippi State University

-Bioproducts, Dr. Liam Leightley of Mississippi State University

Sandra Cannon of the Department of Energy's Pacific Northwest National Lab (PNNL) delivered the



(left to right) Lin Wei of Mississippi State University, Jackie Gleason of USDA, Shantelle Hughes of Jackson State University and Stephen Dufreche of Mississippi State University. Not picture is Shelby Glover, winner of the 1st Annual Biomass Studies Scholarship

luncheon keynote address, highlighting the necessity for environmentally preferable purchasing, and some of the environmentally

friendly products that PNNL is purchasing and developing.

It was an honor to have Jackie Gleason, Acting Administrator of the United States Department of Agriculture (USDA) Rural Development- Business and Cooperative Programs, on hand to give remarks on USDA's support of biomass pro-



(left to right) Brent Bailey of Mississippi Biomass Council, Jackie Gleason of USDA, Monte Reeves of Mississippi Biomass Council, Nick Walters of USDA, Byron Wilson of Mississippi Biomass Council and Sumesh Arora of Mississippi Biomass Council

grams and to award prizes for the student research poster contest winners. Seventeen research posters were presented this year, a 70% increase from last year. First place winner was Shantelle Hughes of Jackson State University; second place was Stephen Dufreche of Mississippi State University; and third place was Lin Wei of Mississippi State University.

The first annual MBC undergraduate scholarship in biomass studies was awarded to Shelby Glover. Shelby is a polymer science major at the University of Southern Mississippi, who accepted the award via video. The scholarship was sponsored by the Mississippi

Technology Alliance- Strategic Biomass Initiative.

Mississippi Representative David Gibbs, who was present for the entire two-day conference, said the conference was "*right on time. The legislature tried this year to pass some biodiesel legislation, but we were only able to get a study committee formed.*" Gibbs added that, "*as little as I know about biomass technologies, [the conference] was beneficial in helping me to stay abreast of what's going on in biomass, and inspired me to want to learn more about it.*"

The Mississippi Biomass Council thanks all who attended the conference or contributed in any way to its success, especially Bill Miller, who delivered closing remarks, and hopes to see everyone again next year. Please visit the MBC website (<http://ms-biomass.org/>) for additional information. Conference presentations will be available to attendees through this website.

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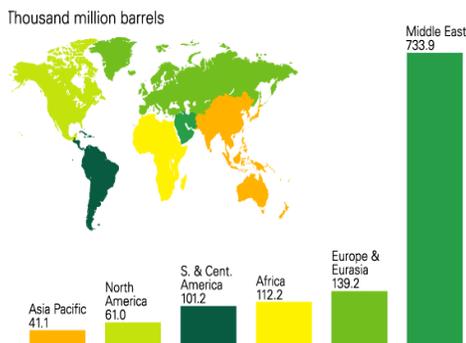
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PRESIDENT'S MESSAGE



Wow, what a difference \$3-plus gasoline can make in changing the public's sentiment as well as that of policy leaders at all levels of government! Now everyone is talking about the high cost of energy – main stream media in TV, newspapers and all sorts of magazines are full of articles about alternative forms of energy and energy efficiency. Cost is not the only reason that our leaders are up in arms. National security is another major concern, because even though we are the largest consumer of oil in the world, all of North America only has about five



percent of the global reserves as evident from recent data published by British Petroleum.

President Bush's State of the Union Address earlier this year has gone a long way to shed light on the value of biomass technologies in lowering "our addiction to foreign oil." Dare I say that "switchgrass" is a household word now and is being touted as the magic crop to solve a lot of these issues? Yet those of us who have been working with biomass feedstocks and conversion technologies

know that, while the promise of biomass based energy and biofuels, as well as other bioproducts such as polymers and chemicals is limitless, there are still many challenges to overcome to bring down the cost of some of these technologies.

A recent issue of Business Week magazine (May 22, 2006) briefly looked at several technology options and stated that commercial production of cellulosic ethanol is still 10 years away and called corn based ethanol "a stop-gap" measure indicating its tight supply. While some may look at this pessimistically, the encouraging thing that I would like to point out is that everyone is now taking note of the potential we have from agricultural feedstocks. It also underscores the immediate and critical need for additional research and development funding such that more cost effective biomass technologies can be brought to the commercial arena as quick as possible.

For its part, the Mississippi Biomass Council is working hard to get this message to various cross sections of the masses. The MBC recently endorsed the 25X25 vision that calls for 25% of the nation's energy coming from the agricultural sector by the year 2025.

I believe that we have an excellent and dedicated team at MBC that understands the importance of biomass resource utilization for Mississippi and congratulate the entire team along with several other individuals who endured long hours to put on a great show at the 5th Annual Southern BioProducts Conference. It was the best attended MBC

conference ever and we had almost a 70% increase in the number of student posters. The first annual \$1,000 undergraduate biomass studies scholarship was also awarded this year. The staff at Pearl River Resort did a great job to accommodate us in every way. We received feedback from about 20% of the attendees, which I am told is a very good survey response. These responses will help us in making improvements for next year's conference.

I have to thank the Board of Directors of the Mississippi Biomass Council for giving me the opportunity to serve a full one year term starting this spring. I am grateful to the Board for making the decision to request the other officers to stay on as well. All officers and Board members volunteer their time and other resources to keep this organization moving forward and growing. I am looking forward to the exciting events that the MBC is planning for the upcoming year and urge all those who receive this newsletter to support the MBC by becoming its members.

Please contact me at sarora@technologyalliance.ms or 601-960-3659 if you have "biomassy" questions or comments.

HARVEST RENEWABLE ENERGY BY BIOMASS CONVERSION WITH MICROORGANISMS BIOFUEL PROJECT

Rationale: Selected fermenting microorganisms and/or their enzymes can transform various agricultural wastes biomass into useful fuel chemicals such as ethanol.

Current Biotechnology Research: Dr. Hwang and his colleagues, Drs. Maria Begonia and Ken S. Lee, are working on a DOE (Department of Energy) project to maximize ethanol production from sugars converted by acid or enzyme hydrolysis of lignocellulosic biomass. Outcome of this study will affect both local and global communities, since Mississippi is rich in various wastes biomass and the Earth is in need of alternative energy sources when the fossil fuel reserves are being depleted.

Future Research and Commercial Biotech Applications: Biological agents such as microorganisms have received intensive attention for their application in biodegradation process without harsh side effects. Ultimately it is the microbial enzymes that mediate the transformation process. Therefore, there has been strong interest in investigating the possibility of directly applying enzymes to degradative applications. The cost effectiveness of using an enzyme for biodegradation application can be enhanced by immobilizing the enzyme on a solid.

This results in operational stability and durability of the enzyme and may lead to its reuse in a continuous process. In Dr. Hwang's laboratory the use of of laccase immo-

bilized on kaolinite or nanoparticles was found to be efficient in oxidizing anthracene or benzo[a]pyrene on a continuous basis without significant loss of activity. In addition, experimental results also indicated that immobilized enzymes' activity was not inhibited by some of the cell-damaging intermediate products generated during the transformation process. In mid February 2006, Drs. Hwang, Begonia and Lee, and several faculty of three other major Mississippi universities submitted a joint proposal to DOE for one-year funding through Mississippi Technology Alliance - Strategic Biomass Initiative (MTA-SBI) office. If funded, the study is projected to start prior to summer 2006.

In this project entitled "Depolymerization of lignocellulose by fungal cells and immobilized enzymes", JSU investigators will use whole fungal cells and mixed immobilized oxidation and hydrolysis enzymes (eg., laccases, lignin peroxidase and manganese peroxidase) for depolymerizing lignocellulose to sugars for microbial ethanol fermentation.

The advantages of these microbially-based technologies or systems include avoidance of using concentrated sulfuric acid, no need for adaptation period, short treatment period and recovery of the enzymes. In this study the ethanol yield and cost effectiveness of the immobilized enzymes technology will be compared to the production proto-

cols by using whole lignocellulose degraders (e.g., white rot fungi) and the established protocols using acid hydrolyzates. The first two processes are hypothesized to be more economical and possess strong potentials for commercialization of the know-how protocols and/or the immobilized enzymes product. The study objectives are: 1. To develop protocols of using immobilized enzymes technology to maximize ethanol yield of microbial fermentation of lignocellulosic biomass 2. To utilize live cultures of fungal whole cells and filtered fungal culture solution or extract to decompose plant lignincelluloses 3. To compare the cost-effectiveness of the immobilized enzymatic hydrolysis technique to depolymerization by whole fungal cells and the developed JSU protocol of acid hydrolysis 4. To share know-how knowledge of the immobilized enzymes technology and whole cells system with MTA members for biomass/biofuel research.

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MISSISSIPPI BIOMASS COUNCIL ENDORSES 25 x '25 VISION

The Board of Directors of the Mississippi Biomass Council recently pledged to support and endorse the goal of America's farms, ranches, and forests providing 25% of America's total energy needs by the year 2025. This goal is to be accomplished while continuing to produce safe, affordable, and abundant food, feed, and fiber.

The 25 X '25 Project is coordinated through grassroots agricultural and forestry leaders and renewable energy advocates who have committed to work together to explore through science and policy the role that agriculture and forestry can play in helping the nation improve its energy security and diversity. The initiative has two primary goals: to help leaders unite behind a common vision for domestic energy production from America's farms, ranches, and forest lands, and to develop a comprehensive strategy to bring this vision to life.

The 25 X '25 vision fits within the mission and purpose of the Mississippi Biomass Council. The Mississippi Biomass Council seeks to provide information about biomass resources, research, development, technology, and use. The Mississippi Biomass Council encourages the use of biomass crops and waste for bio-energy, bio-fuels, and other bio-based products through personal contact with members, education programs, workshops and conferences. Finally, the Mississippi Biomass Council serves as a forum for building public-private partnerships, linking organizations with common goals, and increasing collaborations focused on building bio-based economic development within the state. Corn and soybean producers have shown how America's farmlands can provide "home-grown" forms of energy through the production of ethanol and biodiesel. But farms, ranches, and forest lands can play a much larger role in providing renewable forms of energy. These energy solutions may offer many opportunities for agricultural producers, landowners, and processors to capture more income; for rural economic development; and, for the nation to lessen its dependence on foreign petroleum products.

For more information regarding the 25 X '25 Project, please visit www.agenergy.info. Also, be sure to visit the Mississippi Biomass Council's website at www.ms-biomass.org and consider becoming a member of the Mississippi Biomass Council.

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