# ACREC NEWS

The newsletter of the Clemson University Animal Co-Products Research and Education Center

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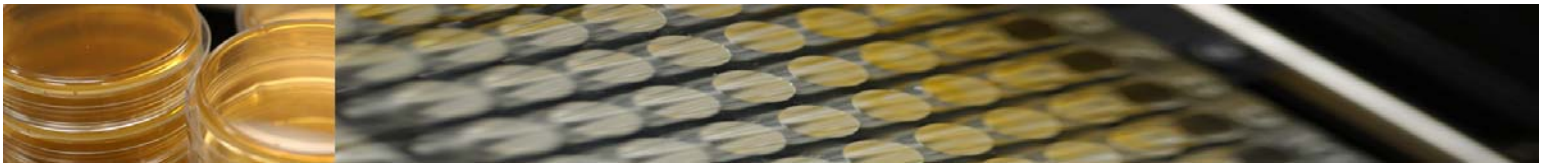
Six members of the Clemson University ACREC research team participated in a roundtable discussion at the FPRF meeting in Miami Beach on October 23, 2007. Participants began with a brief description of their current research projects and then an open discussion commenced on the research needs of the industry. Immunologist Dr. Thomas R. Scott and microbiologist Dr. Annel K. Greene addressed biological issues including new product development and validation of destruction of avian influenza. Chemical engineer Dr. Amod Ogale and polymer scientist Dr. Igor Luzinov discussed development of new polymers from animal co-products. Chemical engineers Dr. Dora Lopez and Dr. James G. Goodwin, Jr. discussed biofuels and biodiesel.

Dr. Tom Scott has isolated proteins from animal co-products known as "supramammary lymph node proteins" which have potentially high value applications in a variety of uses from animal feeds to biomedical products. He is studying the use of these proteins for growing cell lines and monoclonal antibodies and for use in biomedical test kits. Each application has great potential economic return. Dr. Scott also is working with a team which includes Dr. Adam Leaphart, Dr. William C. Bridges, Jr., Dr. Annel Greene, and others on a study of the thermal destruction of the avian influenza (AI) virus in rendered products. In a companion project to this, Dr. Greene, Dr. Bridges and Dr. Richard Figliola are developing methods to map the interior temperature of the rendering cooker in order to confirm sufficient heat treatment of all rendering materials. These two projects are designed to validate the destruction of avian influenza. In case of an outbreak of this deadly disease, the impact on the rendering industry could be devastating. It is imperative to have documentation proving destruction of the virus via rendering processes to ensure continued processing and sale of animal meals. These two projects are designed to provide that data. Dr. Greene is also conducting a literature review on dissolved air flotation (DAF) sludge.

Dr. Amod Ogale is Deputy Director of the Clemson University Center for Advanced Films & Fibers which is a National Science Foundation funded center. The Center annually receives several million dollars in research funding from federal and private sources. This funding has allowed creation of an infrastructure for studying synthetic polymers and natural fibers. Recognizing that resins are often worth several thousand dollars per ton (*continued Page 2*),

Pictured from left to right: Dr. James G. Goodwin, Jr., Professor and Chairman of the Department of Chemical & Biomolecular Engineering, Dr. Dora Lopez, Post-Doctoral Research Fellow, Department of Chemical & Biomolecular Engineering, Dr. Igor Luzinov, Associate Professor, School of Material Science & Engineering, Dr. Amod Ogale, Professor, Department of Chemical & Biomolecular Engineering and Deputy Director of the Clemson University Center for Advanced Films and Fibers, Dr. Thomas R. Scott, Professor, Department of Animal & Veterinary Sciences, Dr. Annel K. Greene, Professor, Department of Animal & Veterinary Sciences and Director of the Clemson University Animal Co-Products Research and Education Center. (Photograph courtesy of Ms.Tina Caparella)



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Dr. Ogale has worked to develop flexible polymers from animal co-products. Using feather meal and other rendered proteins, Dr. Ogale uses extrusion to create geomembranes. Although the mechanical properties of his polymers are not exceeding synthetic polymers, research into processability indicates great possibilities in creating a wide array of economically viable, improved polymers. Dr. Igor Luzinov also is working on developing polymers from animal co-products. However, his research objective is to develop plastics and polymer products using compression molding. He has extensive experience in making "green" polymers which are materials formed from renewable sources. Rendered animal proteins are partially denatured making them more difficult to work since many of the active groups have already formed bonds. However, Dr. Luzinov is investigating a number of ways to process the proteins to improve polymer properties and has successfully created a number of polymers.

Dr. Dora Lopez discussed the life cycle of grease and fats from the rendering industry in a project in collaboration with Dr. David Bruce. The objectives of the project are to determine if biodiesel made from rendering fats are environmentally friendly (reduced greenhouse gases) and if it has a positive energy balance. Dr. Lopez distributed a survey to industry members to gather data for conducting the study. Dr. James Goodwin discussed the economics of biodiesel production. Current biodiesel production techniques violate standard bioprocessing techniques by using batch processes, many separation steps, etc. These operations contribute greatly to the cost of producing biodiesel. Processing costs are dependent on size; in general, the larger the operation (30 million gallons/year or larger) the greater the cost efficiency. Use of heterogeneous catalysts reduces separation costs, reduced corrosiveness on equipment (as opposed to acid or base catalysts), and allows increased operating temperatures resulting in faster reactions. Using alternative reactor systems, Dr. Goodwin's research indicates cost savings of approximately 25% can be achieved over conventional biodiesel production methods.

In the next issue of the *ACREC News*, the research needs and directions discussed during the open audience forum will be presented.

The Clemson University faculty members express gratitude to Mr. Gerald "J.J." Smith and Valley Proteins for providing transportation to and from the meeting in Miami Beach.

Dr. Thomas Jenkins and his team are investigating improvements to tallow for use as a dairy feed ingredient. At high intake levels, tallow can interfere with fermentation within the rumen. Dr. Jenkins and his team are working to convert the tallow to protect it in the rumen. The team's goals are to make tallow a more valuable fat source and to modify solid or semi-solid tallow so it is more easily mixed into dairy animal feeds.

Fall 2007 ACREC Governing Board meeting at Clemson University held September 25, 2007. From left to right, Dr. John W. Kelly, Chair, Mr. Gerald "JJ" Smith, Dr. Alan R. Sams, Dr. Annel K. Greene, Center Director, Dr. James G. Goodwin, Jr., Dr. Doris Helms, Treasurer, Mr. Kevin Kuhni, Dr. Sergio Nates, Vice-Chair (absent: Mr. John Dupps).


Fall 2007 ACREC Research Committee meeting at Clemson University held September 25, 2007. From left to right, Dr. Annel K. Greene, Chair, Mr. Gerald "JJ" Smith, Mr. Doug Smith, Mr. David Kirstein, Vice-Chair, Dr. Sergio Nates, Dr. James G. Goodwin, Jr.

At the Fall 2007 ACREC Research Committee and Governing Board meetings, research project proposals submitted in response to the Request for Proposals were reviewed. Although all proposals were excellent, due to limited funding remaining in this research year, one research project was chosen for funding effective November 1, 2007. The committee requested re-submission of one other proposal for possible funding during the Spring 2008 Request for Proposals. The project entitled, *Improving the Microbiological Safety of Rendered Animal Meals Using Biological Treatment,* by Dr. Xiuping Jiang was selected. This project involves use of unique and cutting edge foodgrade biological control methods for reducing *Salmonella* in rendering environments. You can read more about Dr. Jiang's project in the "ACREC Solutions" article in the December 2007 issue of *Render Magazine.*

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