



DIBANET

NEWSLETTER

June 2010



DIBANET (www.dibanet.org), the Development of Integrated Biomass Approaches Network, is a 42 month, € 3.73m research project that is funded by the EU's Seventh Framework Program. It is coordinated by the University of Limerick (www.carbolea.ul.ie) in Ireland, and builds on the key, complementary, strengths of European and Latin American researchers and industries to

advance the development of second generation biofuels. It focuses on the conversion, by abiotic means, of the residues and wastes of Europe and Latin America. DIBANET uniquely offers the possibility for transforming sugar mills to diesel miscible biofuel production facilities through the combination of the ethanol produced from the sugar and the levulinic acid produced from the sugarcane bagasse.

DIBANET Project Meeting in Buenos Aires



DIBANET consortium members at the recent project meeting in Buenos Aires.

The first project review meeting of DIBANET took place in Buenos Aires on May 18th-19th. This meeting included the presentation of results to date and discussion of future strategies for the project by DIBANET's project partners.

The progress to date, as detailed in the two day meeting that was hosted by YPF and the University of Buenos Aires, is summarised below:



Chipped Miscanthus before acid hydrolysis

- A reactor system for the production of levulinic acid from biomass is now operational at the Carbolea Research Group at the University of Limerick, Ireland (www.carbolea.ul.ie).

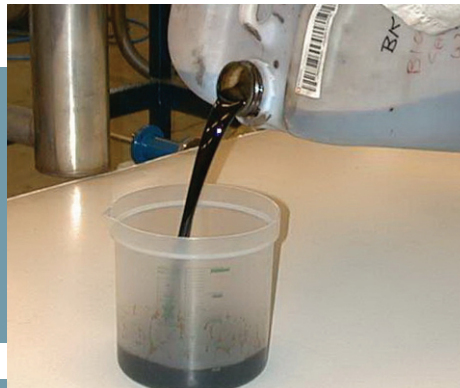


Acid Hydrolysis residues produced from Miscanthus

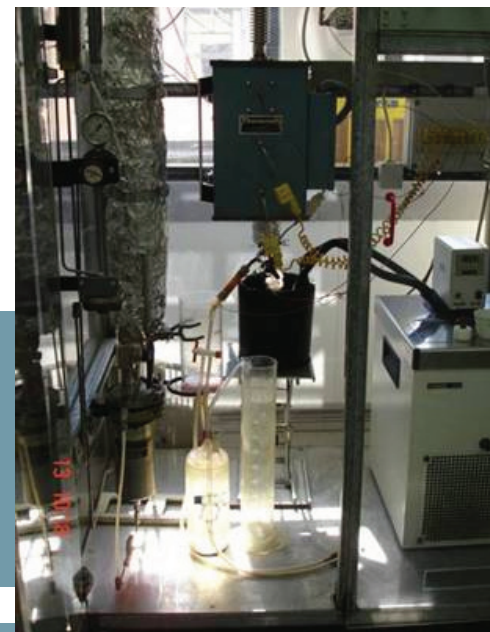
- Aston University (UK) and CETH (Greece) have analysed and pyrolysed the residues from this system and are working towards the production of diesel miscible biofuels from these, therefore eliminating waste from the process and maximising potential revenue.



300g/hr pyrolysis unit at Aston

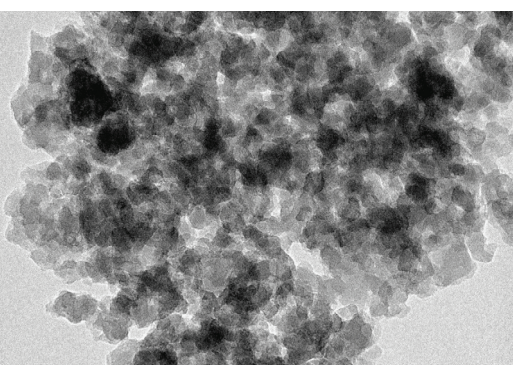


Bio-oil



CETH/CPERI small scale catalytic pyrolysis unit of Acid Hydrolysis Residues

- University Federal Rio de Janeiro (Brazil) and the University of Buenos Aires (Argentina) have made exciting new developments regarding catalysts for both the upgrading of bio-oils from pyrolysis



TEM image of Silica-included heteropolyoxometalate catalyst produced by UBA.

and the conversion of carbohydrates and levulinic acid. A free fall reactor with vapour flow through a fixed bed of catalyst has been built at UFRJ for catalyst testing. Sulphonated carbon nanotubes are being synthesized at UFRJ to be tested as acidic catalysts in the levulinic acid esterification.



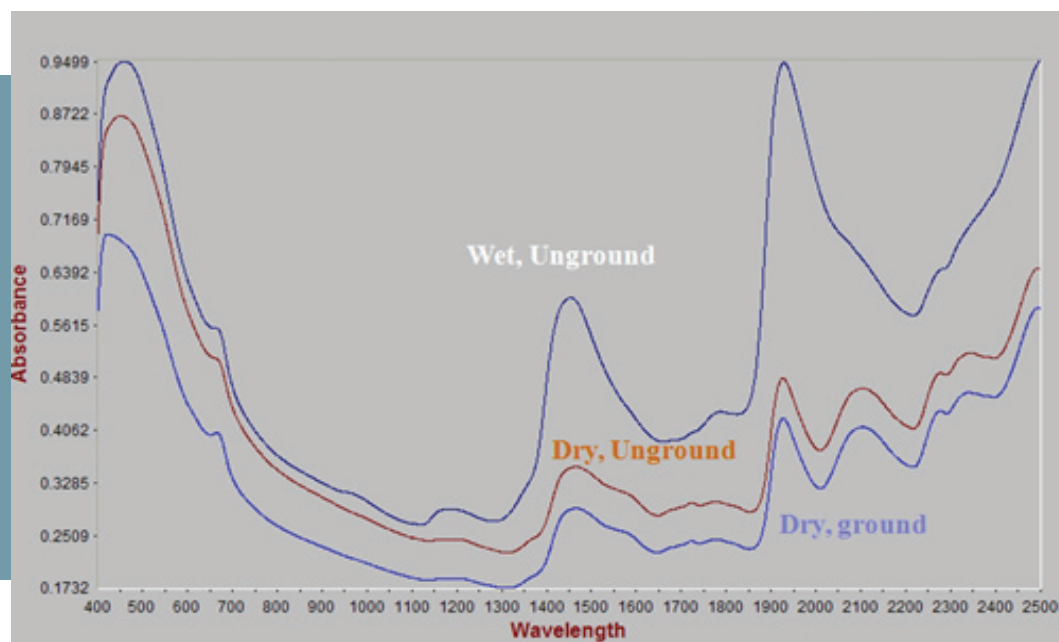
Catalyst test reactor at UFRJ

- It was agreed that the project should focus on the processing of sugarcane bagasse (from Latin America) and Miscanthus (from Europe) in the hydrolysis reactor. The end target is the design of a commercial system for a Brazilian sugarmill.



Sugarcane bagasse, Brazil

- Project partners demonstrated that Near Infrared Spectroscopy is a highly effective technology for rapid feedstock analysis and evaluation, subsequent work will focus on the potential for applying such a system at future biorefineries and sugar mills - “Such a system will allow suppliers of feedstock to be paid based on the biofuel potential of their material” said Daniel Hayes, DIBANET researcher at the University of Limerick.



Near Infrared Spectroscopy spectra of a miscanthus sample after various stages of processing

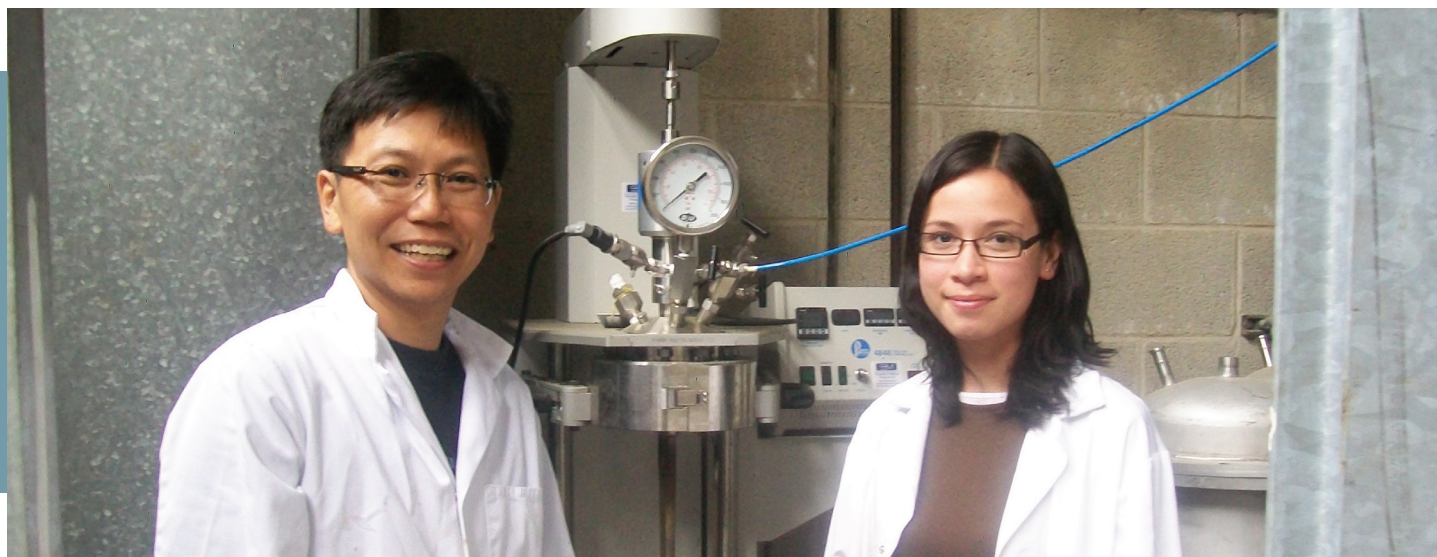
A main focus of DIBANET is that the key criterion of a biorefinery is fully exploited, principally that each chemical constituent of biomass is used to its maximal potential and that wastes are minimised or eliminated. Hence, residues from the hydrolysis process are used to produce more biofuels via pyrolysis and the biochar residue from this subsequent processing stage is evaluated as a plant growth promoter and carbon sequester. There is a particular focus on the best means by which to integrate all these technologies in order to develop a commercially competitive system.

The developments outlined in the first project meeting have allowed advances to be made at many key points of this DIBANET process chain.

Project Co-ordinator Prof. Michael H.B. Hayes said “**The exciting results presented at this meeting show the great advances that can occur when leading research groups from Europe and Latin America work together for the greater good of both regions. This is only the first such meeting for DIBANET and we envisage even greater advances in the coming years. Our focus on the production of diesel miscible biofuels from waste materials through abiotic processes offers us a great competitive advantage in the crowded biofuels sector and the concerted effort of all partners is towards the development of a commercial system**”.

The importance of this research to the industry was underlined by the hosting of this event at the headquarters of YPF, a large Argentinean oil company. YPF will analyse and evaluate the range of biofuels produced from the DIBANET technologies. “Energy company YPF is engaged in several projects for alternative energy sources including the development of environmentally friendly second generation biofuels from different feedstocks. Technological cooperation between the European Union and Latin America through the DIBANET project is an excellent means of achieving those goals that are aligned with its strategic plan” said Sergio Fabián Sein of YPF.

New members join the DIBANET Research Team



Dr. Buana Girisuta and Ms. Karla Dussan join the DIBANET research team at University of Limerick.

Two new researchers have recently joined the DIBANET team at University of Limerick.

Dr. Buana Girisuta, former Head of Chemical Engineering Department and the Biorefinery research group, at the Parahyangan Catholic University, Indonesia, has a PhD in Chemical Engineering entitled „Levulinic acid from lignocellulosic biomass” from the University of Groningen, the Netherlands. The primary objective of this doctoral research was to define optimum catalysts, reaction conditions and reactor configurations for the conversion of

lignocellulosic biomass to levulinic acid (LA), which has been identified as one of platform chemicals. Following on from his PhD Dr. Girisuta was involved in the BIOCUP consortium that was supported by the European Commission through the Sixth Framework Programme for Research and Technological Development. The key-objectives of this research were to develop the isolation and fractionation technologies to recover organic acids from the aqueous fraction of pyrolysis oil. Dr. Girisuta’s research has been published in peer-reviewed journals and presented at international conferences.

In DIBANET **Dr. Girisuta will focus on the hydrolysis of lignocellulosic materials for the production of levulinic acid.**

Ms. Karla Dussan holds a Bachelors degree in Chemical Engineering from the National University of Colombia. Her studies focused on heterogeneous catalysis, with some emphasis on the petroleum industry and petrochemical processes. Karla has previously worked on thermal processes for biomass and waste materials, including residues of the Colombian palm oil industry, in the research group BIOT (Biomass and Thermal Optimisation of processes) at the National University of Colombia.

During 2008, Karla worked as an exchange student in the Thermal Engineering Institute in Kassel University, Germany. There she developed testing protocols for steam gasification of beechwood char for the development of a kinetic model for the reaction between 700-950°C, in a steam atmosphere 30-70%v. H₂O.

DIBANET aims to foster cooperation and form strong links between Europe and Latin America by the establishment of DIBANET scholarships for Latin American students. **Karla is the recipient of the DIBANET scholarship and her PhD research will involve the assessment of pre-treatments for the acid hydrolysis of biomass to levulinic acid.**

DIBANET's biochar research accepted for publication

A paper by members of DIBANET at University of Limerick entitled "Biochar from Biomass and Waste" (Kwapinski et al., 2010 Waste. Biomass. Valor. DOI 10.1007/s12649-010-9024-8) has been published in the new journal Waste and Biomass Valorization. This paper examines the roles that soil amendments with biochar can have on soil fertility, carbon sequestration, on the emissions of greenhouse gases from soil, on fertilizer requirements, and on waste management. Results from DIBANET research are presented, showing that biochars produced under different conditions can have varying effects in plant growth. This further strengthens the need for a biochar classification system.

Upcoming Conferences

3rd International Biochar conference IBI 2010 - The International Biochar Initiative (IBI) and EMBRAPA are pleased to announce the 3rd International Biochar Conference: IBI 2010, which will be held in **Rio de Janeiro, September 12 - 15, 2010**. The organisers expect the conference to be the largest international biochar conference to date and are building the agenda and the activities on the past two international conferences as well as the regional and national biochar conferences of the past few years. For more information please visit the conference website www.ibi2010.org

Bioten, the UK's National Bioenergy Conference takes place on the **21st - 23rd September 2010 in Birmingham, UK**. This conference is sponsored by SUPERGEN Bioenergy which is funded by the UK Government. Aston, project partner in DIBANET is also a member of the SUPERGEN consortium. For further information please visit the conference website www.bioten.co.uk

DIBANET PhD Studentship

Biomass pyrolysis and upgrading: Applications are invited for a three year PhD studentship, supported by the European Commission through the DIBANET project to be at Aston University. **The research involves experimental fast pyrolysis of biomass and residues and the upgrading of the resultant gas and liquid products into marketable biofuels.** Due to the nature of the funding, this position is only open to suitably qualified engineers or scientists from Latin American countries with citizenship of one of these countries. The successful applicant should have a first class or upper second class honours degree or an equivalent qualification from a Latin American country with excellent GPA/Grades. This qualification should be in chemical engineering, applied chemistry or a relevant discipline such as mechanical engineering. Evidence of a high level of proficiency in both written and spoken English is also essential.

For enquiries about this position contact Professor AV Bridgwater by email at: a.v.bridgwater@aston.ac.uk

For more information on DIBANET please visit our website www.dibanet.org
or contact the project manager Corinna Byrne at info@dibanet.org

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