

# BIOENERGY NEWS

March 2006



## FEATURE ARTICLE:

### ***Bioprocess Engineering Course***

The next course in a long line of highly successful courses held since the mid-1980s on Bioprocess Engineering will take place from 17th – 22nd September this year. Like the last one held in 2003, the venue will be on the beautiful island of Brac, Croatia in the Adriatic Sea. It is organised under the auspices of The European Federation of Biotechnology (EFB) by the Working Group on Bioreactor Performance, in collaboration with other Working Groups (Working Group on Modelling, Monitoring, Measurement & Control and Working Group on Downstream Processing and Recovery of Bio-products) of the Section on Biochemical Engineering Science.

All of the lectures will be given by internationally distinguished university teachers or by leading experts from multinational companies. The course covers the full spectrum of bioprocess engineering, starting from genetic concepts for micro-organisms used to produce pharmaceutical and other products via microbial physiology, bio-reaction kinetics to bioreactor design. The organisms considered range from simple bacteria to highly specialised animal cell cultures. There is also a strong coverage of measurement, control and optimisation and how they interact with each other and with the specific bio-reaction of interest. Finally, there is a broad-brush coverage of downstream processing.

The lectures are supplemented by computer-based exercises; discussions and participants are also encouraged to bring posters of their work which they will also have an opportunity to present. Also, there is a strong social programme, specifically designed to ensure that there are many opportunities to discuss the course with the lecturers.

The course is directed specifically at Ph.D. students and experienced biotechnologists from research institutes, universities and industry. Participants are expected to have a background in chemical/biochemical engineering, biotechnology or a related discipline. The course consists of a series of carefully selected lectures combined with computer (Matlab)-based tutorial sessions. The lecturers, who are all acknowledged specialists in their fields, are available throughout the course for informal discussions with participants. The course also provides a forum for highlighting recent research in relevant areas and participants are encouraged to present a poster on their work. Selected candidates will be invited to make short oral presentations (of approximately 5 minutes duration), at a 'Speakers' Corner', to be held during the course.

For all industrial processes, modelling, optimisation and control are the keys to enhancing productivity and ensuring product quality. In bioprocess applications, however, there are commonly a number of limitations to the implementation of these approaches; the challenges lie primarily in the effective coupling of reactor configuration, process design and control with an understanding of microbial performance under specified conditions.

EFB Bioprocess Engineering Course (BEC) is not only the best forum to exchange the most relevant scientific information; it is the most popular forum for young scientists to join the best European Scientific Centres and Universities.

Join us on the Great United Europe, EFB Bioprocess Engineering Course that is performed in Europe every second or third year only. As there are only 70 places available, and EFB BEC is getting more and more popular worldwide, it is no surprise that the course is usually overbooked.

In the EFB we are very honoured that this event is linked to International Organisation on Biotechnology and Bioengineering (IOBB), and as IOBB vice chairman, I will take care that all of

the interested IOBB members and their students will find a place on this popular event.

This is the first educational event of future joint IOBB-EFB events. The next in preparation and close to announcement is a Basic Biotechnology and Bioengineering Course in 2007.

Marin Berovic, IOBB Vice Chairman

#### **NEWS BRIEFS:**

##### ***Biodiesel Plant in Singapore***

Two important players in the worldwide oilseed business are entering biodiesel production in South-east Asia. The German company Peter Cremer GmbH is intending to build a 200.000t/y plant and Archer Daniels Midland (ADM), already active in the biodiesel business in Germany, is planning to join in this venture with a plant of 150.000t capacity.

As global demand for biodiesel is increasing every day, both companies expressed their interest in building a chain of biodiesel plants in other Asian countries as well. With the fossil diesel price moving at around 60 – 70 US\$ per barrel biodiesel is seen as being very competitive at an envisaged price of 25 – 30 US\$ per barrel according to Peter Cremer GmbH.

Singapore was chosen because of its excellent connectivity and easy access to large palm oil feedstock supply countries like Malaysia and Indonesia.

##### ***Bioethanol Plant in the UK***

Work has started on the UK's first bioethanol production facility which will use sugar beet previously destined for the world market.

British Sugar is building a £20m plant to produce 70m litres at Wissington, Downham Market in Norfolk, expected to be in production from early 2007.

Farmers across Norfolk, Cambs and Suffolk will grow the sugar beet. British Sugar chief executive Mark Carr said Government backing for "renewable" transport fuels was crucial to the firm going-ahead with the unit.

The plant takes up all the UK produced sugar previously destined for the world market which, under a recent World Trade Organisation ruling, cannot now be exported.

##### ***Cellulosic Ethanol***

The heated debate over biofuels took another sharp turn recently: new research published in the journal *Science* claims that replacing fossil fuels with corn-based ethanol is energy-efficient (contrary to some previous studies), but doesn't do much to cut greenhouse-gas emissions. Researchers from University of California-Berkeley determined that ethanol results in a net energy gain of about 20 percent, but that the pollution generated in processing the corn offsets most of ethanol's gains in greenhouse-gas emissions.

Ethanol fuel produced from corn reduces petroleum use by about 95%, the study showed, while reducing greenhouse gases by about 13%.

The researchers at UC-Berkeley compared six analyses of the energy required to produce ethanol and the energy benefits of ethanol and other co-products. The report found that those studies most critical of the energy benefits of ethanol ignored the added energy benefits of co-products. The report also examined the production of ethanol from grasses and other "cellulosic" biomass sources, and found that the energy benefit would decrease slightly, but the greenhouse gas benefits would be greatly enhanced.

##### ***Footnote 1:***

Several companies are already pursuing cellulosic ethanol. Abengoa Bioenergy, which has a pilot plant in Nebraska, is building a plant in Spain to produce 110,000 gallons per month of cellulosic ethanol from agricultural residues. MEMS USA, Inc. plans to build a facility in northern Ontario capable of producing 5 million gallons of cellulosic ethanol per month from forestry and mill waste and Iogen Corporation is working with Volkswagen and Shell to study the feasibility of building a cellulosic ethanol plant in Germany.

##### ***Footnote 2:***

Cornell University scientist David Pimentel -- author of several studies questioning ethanol's energy efficiency -- disagrees with the findings, saying they fail to factor in farm machinery and overestimated the value of corn by-products. But all agree that the future of ethanol is not corn, but higher-cellulose plants like grasses and wood.

### ***\$160 Million for Biorefinery Projects***

DOE announced this month an offer of \$160 million in funds over the next three years to construct up to three biorefineries in the United States. Biorefineries are a concept similar to today's refineries, except that instead of using petroleum as their raw material, they draw on woody biomass resources such as agricultural waste, trees, forest residues, and perennial grasses. Like today's refineries, biorefineries will produce both fuels and chemicals.

The goal of the new solicitation is to demonstrate that commercial biorefineries can be profitable once initial construction costs are paid. DOE will provide up to \$100 million for any single demonstration project, and industry is required to provide at least 60 percent of the total cost of the project. The solicitation is part of President Bush's Biofuels Initiative, which includes a goal to make cellulosic ethanol derived from woody biomass cost-competitive by 2012.

### ***Queensland Ethanol***

CSR has approved an A\$15 million project to enable ethanol fuel production at its Sarina, Queensland distillery. The ethanol is currently reprocessed to fuel grade (anhydrous) at the company's Melbourne facility, but the project awarded to Bilfinger Berger Services will see Sarina directly produce 32 ML of fuel grade ethanol a year. CSR's total ethanol capacity will be 60 ML when the project is completed in July.

Also in Queensland, BP has opened a new \$240,000 ethanol blending plant at Mackay, which will produce some 40 ML of E10 fuel a year and mean supplies for the region will no longer be trucked from Brisbane.

### ***Lower VAT on Biomass Heaters***

HM Revenue & Customs in the UK has announced that a reduction of VAT on wood fuelled and other biomass heating equipment to 5% came into effect from 1st January 2006. This is an extension of the reduced rate of VAT for certain specified energy saving materials. From 1 January 2006, this is extended to include the installation of boilers fuelled solely by wood, straw or similar vegetal matter in homes and certain residential and charity buildings. This measure is intended to encourage the use of microgeneration using sustainable energy sources, promote household energy efficiency and contribute to the UK

Government's commitment to reduce carbon dioxide emissions.

### ***US Renewable Fuel Standard***

The U.S. Environmental Protection Agency (EPA) published new regulations for ethanol use in late December. The Energy Policy Act of 2005 gave EPA the authority to establish a new Renewable Fuels Standard Program, which will double the use of fuels produced from U.S. crops by 2012. The regulation explains how industry will comply with the provision requiring that the gasoline blends sold or dispensed to U.S. motorists this year contain, on average, 2.78 percent renewable fuel (such as ethanol), an amount equal to about 4 billion gallons.

### ***Gasifiers in Demand***

Now that oil prices are doubling every five years, the Biomass Energy Foundation, BEF, is expanding its operations. It has opened a 3,000 ft<sup>2</sup> facility in Golden, Colorado, and is actively bidding on gasifier projects in the 40-100 kW range. It has three live projects involving wood chips, MSW waste pellets and exotic fruit pits this year already.

Tom Reed and the BEF is building on its 30 years of experience in gasifiers starting with the Purox MSW oxygen gasifier in the 1970s, the stratified downdraft air/oxygen gasifier at NREL and SynGas Inc in the 1980s, major innovations in low tar gasifiers in the 1990s and recent gasifier projects with the US Department of Defence. The company specialises in modern control technology.

### ***CropGen***

CROPGEN is a research project funded by the EU's 6th Framework Programme, involving 11 partners in 6 European countries. The overall objective of the research is to produce from biomass a sustainable fuel source that can be integrated into the existing energy infrastructure in the medium term, and in the longer term will also provide a safe and economical means of supplying the needs of a developing hydrogen fuel economy. The concept is based on the use of anaerobic digestion (AD) as a means of producing methane from biomass, including energy crops and agricultural residues. The technology of biochemical methane generation is well established: the breakthrough to a cost-effective and competitive energy supply will come from engineering and technical improvements to increase conversion efficiencies, and from reductions in the cost of

biomass. The research will determine how the technology can best be applied to provide a versatile, low-cost, carbon-neutral biofuel in an environmentally sound and sustainable agricultural framework.

### **Largest Wood-burning power station**



E.ON UK to build a wood-fired biomass plant near Lockerbie, Scotland.

Already the home of the world's largest straw-fired power station and Europe's biggest plant powered by poultry

litter, the United Kingdom is to build a facility that will top the UK biomass power league at 44 MW.

This biomass facility costing 130 million euros, will use a mixture of renewable wood-based fuels, and will be built at Stevens Croft. Work there has started and commissioning is expected by the end of 2007.

The development is being carried out by the UK arm of the German utility company E.ON - a major UK energy supplier that already operates hydro, wind and biomass power stations in Europe with a total output of some 6 GW - and is being project managed by the UK's Mott MacDonald engineering, management and development consultancy.

In addition to being planned by E.ON UK Renewables the project's technology will be supplied by Siemens of Germany and Norway's Kvaerner company.

It will initially use burned forest residue of sawdust, branches and off-cuts that will come from a nearby sawmill. Ultimately, the station will consume some 475,000 tonnes of sustainable wood a year, including 95,000 tonnes of short-rotation coppice.

Some 220,000 tonnes of oven-dried fuel will be sourced from nearby areas with 45,000 tonnes being made up of willow trees harvested by farmers. An E.ON UK spokesman said: "We are hoping local farmers will switch to producing fast-growing willows which will be used in preparing the plant's fuel."



### **EVENTS CALENDAR:**

***Ethanol 2006 Australia Conference, Brisbane, 8-11 May***

To Find Out More:

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Website: [www.ethanol2006.com](http://www.ethanol2006.com)

***World Bioenergy 2006, Jönköping, Sweden, 30 May-1 June***

Website: [www.worldbioenergy.se](http://www.worldbioenergy.se)

***2006 World Congress on Industrial Biotechnology & Bioprocessing, Toronto, 11 - 14 July***

Website: [www.bio.org](http://www.bio.org)

***Bioprocess Engineering Course, Supetar, Island of Brac, Croatia, 17-22 September***

Website: <http://www.hdb.hr/bec2006.html>

***20th World Energy Congress, Rome, 11 - 15 November, 2007***

Theme "Energy Future in an Interdependent World"

The Bioenergy Association of New Zealand Inc. (BANZ) comprises companies, research organisations and individuals who have an interest in markets for converting biomass or biowaste into energy. To receive this newsletter regularly, contact the Executive Officer of BANZ for membership details by email: [info@bioenergy.org.nz](mailto:info@bioenergy.org.nz). Back issues of this E-zine are on the website, [www.bioenergy.org.nz](http://www.bioenergy.org.nz)



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