

## **Inbicon and Terranol collaboration demonstrates a fast, high yielding process for 2G bioethanol production**

**Two Danish companies, Terranol and DONG Energy, have under the EUDP Framework Programme demonstrated an efficient process for second generation ethanol production. Proprietary technologies developed by the two companies have been joined in a successful demonstration of yeast based C6 and C5 sugar co-fermentation in industrial scale.**

Terranol and DONG Energy have in a collaboration aimed to develop, implement and test a combination of recent Danish 2G bioethanol production technologies for efficient pretreatment, enzymatic hydrolysis and fermentation. The work is supported by the EUDP Programme for Energy Technology Development and Demonstration.

To obtain high ethanol yields it is important to ferment not only the easily accessible C6 sugars (glucose), but also the more difficult C5 sugars (e.g. xylose), and a yeast that ferments C5 sugars is often essential in order to obtain a cost-efficient production of 2G bioethanol.

By applying proprietary technologies, Terranol has designed genetically optimized C6/C5 yeasts demonstrated to fulfil the requirements in industrial settings with respect to robustness, performance and productivity. This enables increased yields of ethanol production. In October/November 2014 the C6/C5 yeast of Terranol was tested in industrial scale at DONG Energy's demonstration plant for Inbicon 2G ethanol technology in Kalundborg, Denmark. The test results in 270 m<sup>3</sup> scale are very good and in accordance with results obtained in 2 litre laboratory scale. More than 90% of both C5 and C6 sugars have been converted into ethanol within 48 hours using a low yeast pitch.

"We are very happy with the test results. The Terranol yeast yields close to the theoretically maximum and is fast and robust in the Inbicon process. These are important factors to establish positive business cases for commercial 2G ethanol projects," says Jan Larsen, head of Inbicon Technology, DONG Energy. "We are convinced that EUDP will be satisfied that Denmark now has demonstrated yeast, enzymes and process technology for future biorefineries."

"Together with Inbicon we have been able to verify the fine qualities of our yeast in this demonstration trial based on optimized fed-batch fermentation development. It clearly demonstrates that our yeast is a strong candidate for use in commercial 2G bioethanol production," says Birgitte Rønnow, CEO of Terranol.

Results of the demonstration will be presented at the 37th Symposium on Biotechnology for Fuels and Chemicals, San Diego, US on 27-30 April 2015 by both Terranol and DONG Energy.

### **Facts about Inbicon A/S / DONG Energy A/S**

Inbicon A/S develops technology for conversion and refining of soft lignocellulosic biomass into fuel, feed, and green chemistry products. The company has operated a pilot plant since 2003, and in December 2009 the first Inbicon Biomass Refinery was inaugurated in Kalundborg, Denmark, to demonstrate the technology. The plant converts wheat straw into fuel grade ethanol, C5 molasses that can be used as animal feed or for biogas production, and lignin pellets for energy production. Inbicon is a subsidiary of DONG Energy A/S and organized under the business unit New Bio Solutions.

For further information, please visit [www.inbicon.com](http://www.inbicon.com)

### **Facts about Terranol A/S**

Founded in 2007 Terranol A/S is a Danish research and development company dedicated to developing and commercializing C6/C5 yeasts, first and foremost for cellulosic ethanol production.

For more information, please visit [www.terranol.com](http://www.terranol.com)

### **Facts about EUDP**

The EUDP Programme for Energy Technology Development and Demonstration was established in 2007 and promotes new climate-friendly energy technologies that increase security of supply and realizes Denmark's business potential in the energy sector.

For further information, please visit [www.ens.dk/ny-teknologi](http://www.ens.dk/ny-teknologi)