Producing bio-ethanol from agricultural waste a step closer

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Research conducted by Delft University of Technology has brought the efficient production of the environmentally-friendly fuel bio-ethanol a great deal closer to fruition. The work of Delft researcher Marko Kuyper was an important factor in this. His research in recent years has greatly improved the conversion of certain sugars from agricultural waste to ethanol. On Tuesday 6 June, Kuyper received his PhD degree for his research into the subject.

The search for alternatives to the current, oil-based, fuels is the focus of great interest around the world. One of the most attractive alternatives is bio-ethanol - alcohol produced from agricultural crops. At present, bio-ethanol is only made from sugars derived from corncobs, sugar beets, grain and sugarcane, with the help of baker's yeast.

A great number of by-products result from the cultivation of these crops, such as straw and corn husks. It would be a major step forward if this leftover material, which also largely consists of sugar, could be used for the production of bio-ethanol. This would allow agricultural land to be used more efficiently and at the same time prevent competition with food supplies.

Until recently, the problem was that the complex mixture of sugars that makes up these leftover materials could not be efficiently converted into ethanol by the baker's yeast. Delft University of Technology, however, has recently devised a solution for this, which is achieved by genetically modifying the baker's yeast. The Delft researchers have inserted a gene

(derived from a fungus that is found in elephant faeces) into baker's yeast, allowing it to convert an important sugar type, xylose, into ethanol, thereby making the production of bio-ethanol from supplies of leftover materials possible.

During his recent PhD research, Marko Kuyper greatly improved this method: people can now start using agricultural waste products that contain sugar to produce bio-ethanol on an industrial scale. Delft University of Technology and the Kluyver Centre for Genomics of Industrial Fermentation are working together on this project with Royal Nedalco and BIRD Engineering. These parties expect to achieve large-scale industrial implementation within 5 years.

Source: Delft University of Technology