

PRESS RELEASE

BRAIN and Südzucker cooperate in the field of CO₂ utilisation by microorganisms

Zwingenberg and Mannheim, April 13, 2016 – BRAIN AG (ISIN DE0005203947 / WKN 520394), one of Europe's bio-economy leaders, and Südzucker AG (ISIN DE0007297004 / WKN 729700), the largest producer of sugar in the European Union, are intensifying their cooperation in the field of microbial utilisation of carbon dioxide. The cooperation, which is co-financed by the German Ministry of Education and Research (BMBF) as part of the strategic alliance ZeroCarbFP, aims at making the industrial by-product CO₂ available for the production of a multitude of interesting intermediates using optimised platform organisms. During Phase 1 of the alliance, a two-stage process was successfully developed at laboratory scale. Based on these promising results, the two partners have now applied for further funding with the BMBF in order to scale up the process to a pilot facility at the Zeitz CO₂-emitting bioethanol plant in Phase 2 of the strategic ZeroCarbFP Alliance.

The establishment of sustainable processes and the utilisation of side streams to achieve a functioning circular economy is the bio-economy's key ambition. For many years, Südzucker has been pursuing programmes in which industrial side streams are utilised to

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create added value secondary products that help improve the efficiency of its production plants. As Südzucker's technology partner of choice, BRAIN has supported the optimisation of various biotechnological processes in the company, such as the production process of Palatinose™, in the past.

Currently, the partners are pursuing the goal of using the CO₂ generated during the production of bioethanol as material building block. The intermediate products generated from CO₂, such as mono- and dicarboxylic acids, may then be utilised as specialty products in the bioplastics industry, which so far has been dependent on fossil resources.

"For many years, Südzucker AG has endeavoured to make its production processes as sustainable as possible with regard to yield and energy efficiency. We also have had much success when it comes to utilising carbonaceous side streams," states Dr Wolfgang Wach, Head of Biotechnology at Südzucker's Central Department for Research, Development, and Service (CRDS). "The cooperation with BRAIN perfectly complements our own research activities in the field of material use of CO₂. In this context, we have just been able to successfully conclude a project studying algae as utilisers of carbon dioxide."

"By cooperating with BRAIN AG we aim to place the material use of side streams in our industrial processes on a broader base. The first, highly promising results making use of the CO₂ from bioethanol plants in microbial production confirm that we will achieve our goals together with our strategic partner, BRAIN," says Edda Höfer, Project Manager in CRDS at Südzucker.

"We are delighted to have reached the first milestones in our cooperation using CO₂ as a valuable resource. Based on the successfully established laboratory process we, together with our strategic part-

ner, Südzucker, now intend to establish a first pilot facility at the existing bioethanol production site in Zeitz during Phase 2 of the Zero-CarbFP Alliance in order to pave the way for the sustainable use of side streams as resources," says Dr Jürgen Eck, CEO of BRAIN AG. "In addition, we see the potential of using the technology, which we developed in cooperation with our partner, in other CO₂-emitting processes as well, thus permitting us to make it available for widespread industrial use. The microorganisms are undemanding and can easily adapt to different sources of carbon dioxide."

"This co-developed two-stage process of making material use of CO₂ constitutes a major breakthrough. The temperature of the carbon dioxide gas, which is low compared to similar processes, enables significantly higher substrate availabilities. Correspondingly, we have achieved high carbon fixation rates by our first-stage microorganisms," asserts Dr Jörg Mampel, Project Head and microbiologist at BRAIN. "In the second stage, we have been able to provide our partner, Südzucker, with an entire portfolio of interesting product candidates thanks to incorporating a platform organism. At BRAIN, we are truly delighted that we managed to establish the laboratory process in such a short time!"

About BRAIN

BRAIN AG is one of Europe's technology leaders in the field of industrial 'white' biotechnology. Within strategic alliances, BRAIN AG has identified and developed numerous innovative products and solutions for companies in the chemical, pharmaceutical, cosmetic and food industries by harnessing nature's untapped biodiversity. These active product components are identified by BRAIN AG and contained in the company's "BioArchive", one of the most comprehensive archives of its kind. Since its foundation in 1993, BRAIN has entered into 102 strategic cooperations with nearly every prominent company in the chemical industry. Cooperation partners include BASF, Bayer Schering, Clariant, DSM, Evonik Degussa, Henkel, Nutrinova, RWE, Sandoz, Südzucker and Symrise. The company currently employs around 120 highly skilled personnel.

www.brain-biotech.de

About the Südzucker Group

Südzucker, with its sugar, special products, CropEnergies and fruit segments, is one of the leading companies in the food industry. In the traditional sugar business, the group is the world market leader, with 29 sugar factories and two refineries, extending from France in the west via Belgium, Germany and Austria, through to Poland, the Czech Republic, Slovakia, Romania, Hungary, Bosnia and Moldova in the east. The special products segment, consisting of the functional ingredients for food and animal feed (BENEO), chilled/frozen products (Freiberger), portion packs (PortionPack Europe) and starch divisions, operates in dynamically growing markets. The CropEnergies segment covers the bioethanol activities in Germany, Belgium, France and the UK. With its globally positioned fruit segment, the group is the world market leader for fruit preparations and is a leading supplier of fruit juice concentrates in Europe. In 2014/15, the group employed about 18,500 persons and generated revenues of 6.8 billion €.

www.suedzucker.de

Pictures:



Optimisation of biotechnological fermentation processes of mono- and dicarboxylic acids using carbon-rich industrial waste streams.

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Bioethanol production plant of CropEnergies AG in Zeitz, a subsidiary of Südzucker: The resulting of CO₂ in the production of BioEthanol is microbially bound will be converted to mono- and dicarboxylic acids

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