BioC4

NEW INTEGRATIVE SUSTAINABLE SYSTEM FROM C4 PHOTOSYNTHETIC MISCANTHUS TO BIOLOGICAL SYNTHESIS OF VALUABLE C4 COMPOUNDS

1° Call:	2015
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Coordinator:	**M. Pascal Vandeckerckove** (Lesaffre International – France) Email: pvk@lesaffre.fr
Project partners:	Johann Wolfgang Goethe-Universitaet Frankfurt, **Germany**; GlobalYeast, **Belgium**; University of Hohenheim, **Germany**; INRA AgroImpact, **France**.
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Website:	faccesurplus.org/research-projects/bioc4

FACCE SURPLUS
SUSTAINABLE AND RESILIENT AGRICULTURE FOR FOOD AND NON-FOOD SYSTEMS

BACKGROUND

Because of the finite nature of fossil fuel resources and the imminent climate change caused by their intensive use, the demand for renewable materials and bio-based chemicals for industrial applications, as well as for renewable energy, will steadily increase. Due to the inherent techno-economic challenges of biochemical compound commercialization, the project BioC4, funded within the frame of FACCE SURPLUS, focus on developing technologies around 'bio-isobu-tanol', a powerful compound platform from which multiple products with high market potential can be launched. Isobu-tanol can be converted synthetically into many valuable building-block chemicals or directly used in fuel with multiple advantages. It can be converted easily to isobutylene or can replace n-butanol as industrial solvent.

OBJECTIVE

The aim of the BioC4 project is to develop an industrial production process for bio-based Isobutanol, which can be used as raw material for biofuel, solvent, or bioplastics. For that purpose, a strong isobutanol-producing industrial yeast strain will be developed. It will have the ability to ferment both hexose and pentose sugars under the harsh conditions present in lignocellulose hydrolysates. In parallel, promising miscanthus genotypes with high saccharification potential will be identified and the most interesting ones will be analyzed and evaluated as eco-friendly raw material. The overall aim of the project is to develop a novel bio-based value chain with minimized environmental impacts and maximized benefits for all stakeholders. This will help policy makers to identify other products and raw materials with a significant reduced carbon footprint.

KEY PUBLICATIONS

- Publication: Wesley Cardoso Generoso, Martin Brinek, Heiko Dietz, Mislav Oreb, Eckhard Boles (2017), Secretion of 2,3-dihydroxyisovalerate as a limiting factor for isobutanol production in Saccharomyces cerevisiae, FEMS Yeast Research, Volume 17, Issue 3, 1 May 2017, fox029, https://doi.org/10.1093/femsyr/fox029 2)
- Poster: Martin Brinek, Mislav Oreb, Eckhard Boles Engineering of Cytosolic FeS Cluster Assembly for Increased Isobutanol Production in Saccharomyces cerevisiae 33rd International Specialised Symposium on Yeast (ISSY33) Cork, Ireland, 26-29 June 2017 3)
- Talk: Eckhard Boles Neue Biokraftstoffe aus pflanzlichen Reststoffen GRADE (Goethe Research Academy for Early Career Researchers) Frankfurt, Germany, 10 November 2016