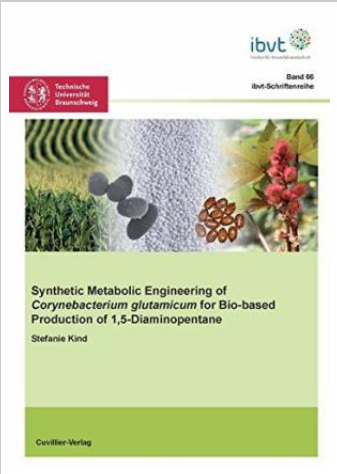

Synthetic Metabolic Engineering of Corynebacterium glutamicum for Bio-based Production of 1,5-Diaminopentane

By Stefanie Kind

Cuvillier Verlag Nov 2012, 2012. Taschenbuch. Condition: Neu. Neuware - Polyamides, due to their extreme durability and strength, are important industrial polymers used e.g. in the automotive industry or in high-value consumer products. Their production from petrochemically derived monomers suffers from the shortage of fossil fuels, rising oil prices, escalating CO2 production as well as low eco-efficiency. Most valuable alternatives are biotechnological processes from renewable resources for the production. Thereby, 1,5 diaminopentane is a promising monomer building block for completely bio-based polyamides like PA 5.4 or PA 5.10. In a first proof of concept, the product spectrum of Corynebacterium glutamicum was broadened towards the novel non-natural product diaminopentane by heterologous expression of an Escherichia coli lysine decarboxylase. An important criterion for the successful implementation of such bio-processes is their economic competitiveness with conventional techniques, demanding for efficient microbial production strains. In this work, synthetic metabolic engineering was applied to create an industrial C. glutamicum diaminopentane-producing strain with excellent production properties in a well-defined genomic context. Computational genome-scale modeling was used to investigate the metabolic properties of the bacterium in silico and to predict concepts for global strain design. By introduction of the identified beneficial genetic targets, the metabolism of the...

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