YEAST CELL FACTORY DEVELOPMENT FOR BIOREFINERIES

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Abstract

The development and establishment of biorefineries are key factors for the sustainable growth of a society based on a bioeconomy. However, to make these bioprocesses economically feasible, intensified and flexible processes, responsive to feedstock and market fluctuations, have to be considered. Fermentation is a core operation unit in this process, typically performed by the yeast *Saccharomyces cerevisiae*. In intensified lignocellulose conversion processes the yeast has to be able to work under very demanding conditions, that is, low pH, presence of fermentation inhibitors, high temperature and solid loadings, simultaneous consumption of C6 and C5 sugars[1,2]. Thus, the development of efficient yeast cell factories is mandatory for bringing lignocellulose-to-bioethanol processes to a next level and also for upgrading these systems for the sustainable production of bioethanol and high-value biochemicals (such as xylitol and arabitol), a vital endeavor to successfully implement a bioeconomy. We will present examples of intensified and productive conditions attained by metabolic engineering strategies applied over robust industrial yeast chassis. The presented results attest the feasibility of intensifying biomass-to-ethanol processes[3] and show how this integrated strategy has the potential to be the driver for the emergence of economical and sustainable processes for biofuels and high-value chemicals' production from lignocellulosic biomass.

[1] Kelbert et al. 2016. Bioenergy Research 9: 750-762.; [2] Costa et al. 2017. Bioresource Technology 227: 24-34.; [3] Cunha et al. 2018. Bioresource Technology, 250, 256-264.

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