

Microbial conversion of biomass into carbon-neutral fuels and chemicals

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Lignocellulosic biomass is the most abundant and renewable resource for the production of carbon-neutral fuels and chemicals. Of various conversion processes of lignocellulosic biomass, microbial conversion in which microorganisms act as biocatalysts offers an economic and environmentally friendly process. With the advances in metabolic engineering and synthetic biology, the performance of microorganisms as biocatalysts has been significantly improved, and the selection of microorganisms is also greatly expanded. Yeasts, single-celled eukaryotic microorganisms, are gaining increasing attention as engineered biocatalysts for industrial production of carbon-neutral fuels and chemicals. Here, we discuss the opportunities and challenges in the production of fuels and chemicals using lignocellulosic biomass by engineered yeasts. Specifically, the recent efforts on the development of engineered yeasts to maximize bioconversion yield and to expand product range in lignocellulosic biorefinery concept with a special focus on a model yeast of *Saccharomyces cerevisiae* and a non-model yeast of *Yarrowia lipolytica*.