

YARROWIA LIPOLYTICA: A VERSATILE MICROBIAL WORKHORSE FOR EXPANDING NATURE'S BIOSYNTHETIC CAPACITY

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Yarrowia lipolytica is an oleaginous yeast that have been substantially engineered for production of oleochemicals and drop-in transportation fuels. It has been considered as a 'generally recognized as safe' (GRAS) organism for the production of organic acids in the food and nutraceutical industry. The high precursor acetyl-CoA and malonyl-CoA flux along with the versatile carbon-utilization capability makes this yeast as a superior host to upgrade low-value carbons into high-value pharmaceuticals and plant natural products (PNPs). Bacteria system in general is less efficient to express the complex gene cluster of plant natural product pathway. Unlike bacteria, yeast has developed spatially separated organelles to partition specialized metabolic functions into distinct cellular compartments. In this talk, we will present strategies to harness the endogenous acetyl-CoA/malonyl-CoA/HMG-CoA metabolism toward engineering efficient yeast cell factories to produce complex oleochemicals, terpenes, polyketides and aromatic commodity chemicals. We identified pathway limitations and assessed genetic engineering strategies to elevate the level of acetyl-CoA, malonyl-CoA, HMG-CoA and NADPH. This work will provide a testbed for engineering *Y. lipolytica* and expanding nature's biosynthetic capacity to produce complex fuels and chemicals from renewable feedstocks.