Yarrowia lipolytica as chassis strain for bioproducts

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Oleaginous yeasts, especially Yarrowia lipolytica, are promising hosts not only for the production of various biotechnologically interesting lipids but also for other lipophilic molecules, such as carotenoids [1]. Based on a broad spectrum of growth substrates together with synthetic and systems biology tools available for Y. lipolytica, we have selected it as a candidate for development of a chassis strain for a plethora of products from the isoprenoid class. As one of the initial steps, we developed a lycopene producing strain of Y. lipolytica. This strain allows us to quickly iterate the design-build-test cycle and develop efficient isoprenoid producer strains and processes with Y. lipolytica. Combinations of different approaches, ranging from fast and efficient DNA assembly and genetic engineering to random mutagenesis and ultra-high-throughput strain selection using a microfluidics platform, will be used. Going hand in hand with host engineering media optimization using bulk waste streams as nutrients is expected to bring new bio-based products to the market.