

The 'LipoYeasts' project: using the oleaginous yeast *Yarrowia lipolytica* in combination with specific bacterial genes for the bioconversion of lipids, fats and oils into high-value products.

Abstract:

The oleochemical industry is currently still dominated by conventional chemistry, with biotechnology only starting to play a more prominent role, primarily with respect to the biosurfactants or lipases, e.g. as detergents, or for biofuel production. A major bottleneck for all further biotechnological applications is the problem of the initial mobilization of cheap and vastly available lipid and oil substrates, which are then to be transformed into high-value biotechnological, nutritional or pharmacological products. Under the EU-sponsored LipoYeasts project we are developing the oleaginous yeast *Yarrowia lipolytica* into a versatile and high-throughput microbial factory that, by use of specific enzymatic pathways from hydrocarbonoclastic bacteria, efficiently mobilizes lipids by directing its versatile lipid metabolism towards the production of industrially valuable lipid-derived compounds like wax esters (WE), isoprenoid-derived compounds (carotenoids, polyenic carotenoid ester), polyhydroxyalkanoates (PHAs) and free hydroxylated fatty acids (HFAs). Different lipid stocks (petroleum, alkane, vegetable oil, fatty acid) and combinations thereof are being assessed as substrates in combination with different mutant and recombinant strains of *Y. lipolytica*, in order to modulate the composition and yields of the produced added-value products.