Modulation of Lipomyces starkeyi's fatty acids profile by metabolic engineering and optimization of single cell oils (SCOs) production

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The demand for more sustainable processes is widespread throughout the growing population, in order to reduce our environmental impact. Biorefineries, defined as the sustainable counterpart of the petroleum refinery, can play a pivotal role for promoting a turnabout from the classical petrochemical industry to a more sustainable bio-based economy.

In this context, oilseed crops are used as renewable oil sources to produce many industrially important oleochemicals. Single cell oil (SCO) is a potential alternative that can substitute oilseed as source of polyunsaturated fatty acids (PUFAs), essential for human nutrition, and many valuable chemicals (e.g. fuels, detergents, plasticizers). SCOs offer different advantages, such as no competition with food production, less labour required, short life cycle, easier scale-up and independence of season and climate.

Here we will present the engineering strategy that we used for synthetically modulate fatty acids profiles of Lipomyces starkeyi and the consequent optimization of the fermentative conditions that we applied for maximizing yield and production of the different strains that we obtained.