

Integrating transcriptomics and metabolomics in the oleaginous yeast *Lipomyces starkeyi* for the production of biofuels and bioproducts

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Project Goals: The goal of this project is to engineer *Lipomyces starkeyi* for the production of biofuels and bioproducts from lignocellulosic sugars. We are interested in identifying sugar transporters, understanding the lipogenesis process, and integrating transcriptomics and metabolomics in the oleaginous yeast *L. starkeyi*.

Oleaginous yeasts are a promising platform for the production of lipids, polyols, and alcohols¹⁻³. The lipids can be utilized directly or can be processed into biolubricants, surfactants, and liquid fuels. *L. starkeyi* has the ability to naturally utilize a variety of carbon sources, especially those from sustainable biomass-derived sugars such as glucose, xylose, and cellobiose. However, *L. starkeyi* has been relatively unexplored due to insufficient knowledge of its physiology as well as the lack of efficient genetic tools⁴.

In our study, we have evaluated the growth of *L. starkeyi* on different carbon sources and performed transcriptome and metabolome analysis to understand the underlying mechanisms of sugar metabolism. We also identified the putative transporters for the utilization of glucose, xylose, and cellobiose. We functionally characterized sugar transporters from *L. starkeyi* in *Saccharomyces cerevisiae*. One putative sugar transporter showed promising results in the co-consumption of glucose and xylose. Our results may inform the metabolic engineering of *L. starkeyi* strains for production of biofuels and bioproducts from plant-based sugars.

References

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