

Metabolic engineering of *Schwanniomyces occidentalis* for increased lipid productivity

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Microbial oil can be produced from biomass in a green and sustainable way without competing with food crops by using oleaginous microorganisms such as yeast, fungi, bacteria and microalgae. Out of 24 different yeast species we have recently selected the oleaginous yeast *Schwanniomyces occidentalis* for the production fatty acids¹. *S. occidentalis* is able to produce fatty acids up to 42% of its biomass and is capable of utilizing a large range of carbon sources (including C5-sugars). Furthermore, it has the ability to grow in the presence of high concentrations of furfural, HMF and acetic acid making it a prime candidate for the production of fatty acids when grown on lignocellulosic hydrolysates².

Polyunsaturated fatty acids, such as linoleic acid and linolenic acid, are widely used for the production of lubricants, resins, plastics and alkyd paints. Furthermore, polyunsaturated fatty acid containing lipids have a good nutritional value, are utilized for health applications and have been associated with reduced atherosclerosis, inflammation and carcinogenesis. Recently, genetic modification of *S. occidentalis* aimed at increased linoleic acid production has led to a 4-fold increase in linoleic acid titer from 0.5 g/l up to 2.2 g/l in non-optimized culture conditions. Further genetic modifications are being discussed to increase the lipid production in *S. occidentalis*.

References

¹Lamers, et al. (2016). Selection of oleaginous yeasts for fatty acid production. BMC Biotechnology. Doi: 10.1186/s12896-016-0276-7

²Sitepu, et al. (2014). Carbon source utilization and inhibitor tolerance of 45 oleaginous yeast species. J Ind Microbiol Biotechnol (41) 1061-1070