Cocoa butter-like lipid production ability of non-oleaginous and oleaginous yeasts under nitrogen-limited culture conditions - DTU Orbit (24/12/2018)

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Cocoa butter (CB) extracted from cocoa beans is the main raw material for chocolate production. However, growing chocolate demands and limited CB production has resulted in a shortage of CB supply. CB is mainly composed of three different kinds of triacylglycerols (TAGs), POP (C16:0–C18:1–C16:0), POS (C16:0–C18:1–C18:0), and SOS (C18:0–C18:0–C18:0). The storage lipids of yeasts, mainly TAGs, also contain relative high-level of C16 and C18 fatty acids and might be used as CB-like lipids (CBL). In this study, we cultivated six different yeasts, including one non-oleaginous yeast strain, Saccharomyces cerevisiae CEN.PK113-7D, and five oleaginous yeast strains, Trichosporon oleaginosus DSM11815, Rhodotorula graminis DSM 27356, Lipomyces starkeyi DSM 70296, Rhodosporidium toruloides DSM 70398, and Yarrowia lipolytica CBS 6124, in nitrogen-limited medium and compared their CBL production ability. Under the same growth conditions, we found that TAGs were the main lipids in all six yeasts and that T. oleaginosus can produce more TAGs than the other five yeasts. Less than 3% of the total TAGs were identified as potential SOS in the six yeasts. However, T. oleaginosus produced 27.8% potential POP and POS at levels of 378 mg TAGs/g dry cell weight, hinting that this yeast may have potential as a CBL production host after further metabolic engineering in future.

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