Suppressing fatty acid uptake by a fatty acid secreting *Saccharomyces cerevisiae* strain

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Biodiesel, in the form of fatty acid esters, produced by oleaginous microorganisms, could represent an attractive alternative of renewable liquid biofuels.

Lipid metabolism has been studied extensively in *S. cerevisiae* and all genes encoding enzymes directly involved in lipid synthesis are known. In this model yeast, exogenous long-chain fatty acids are activated to coenzyme A derivatives prior to metabolic utilization by the fatty acyl-CoA synthetases Faa1p and Faa4p. Free fatty acids are secreted from a *FAA1,4* double mutant (1), which we use as a basis for metabolic engineering of this property. However, secreted fatty acids disappear late in the growth phase, presumably metabolized by the cells (1).

In *S. cerevisiae* the acyl-CoA oxidase ScPox1p catalyzes the first metabolic step of fatty acid beta-oxidation, and null mutants are unable to grow on fatty acids as sole carbon source (2). ScPox1p is the ortholog of the human acyl-CoA oxidase 1, and its expression is strongly induced by fatty acids. A triple knock-out mutant *faa1/4-Δ1 pox1-Δ1* studied in this work shows delayed uptake of the secreted fatty acids.

The fatty acid production of the modified strains was analysed by optical density of the extracellular medium and gas chromatography and results are discussed.

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2. van Roermund CWT, Hettema EH, Kal AJ, van den Berg M, Tabak HF, Wanders RJA, EMBO J. 17(3) (1998) 677–687.