

P3-32 Comparison of γ -decalactone production from castor oil by *Y. lipolytica* mutants in batch and step-wise fed-batch cultures

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Developments of γ -decalactone production processes by ricinoleic acid biotransformation have been made with the wild-type strain, namely *Yarrowia lipolytica* W29. Nevertheless, a rapidly lactone degradation is observed due to the high level of acyl-CoA oxidase activity in *Y. lipolytica* [1, 2].

The purpose of this work is to monitor the performance of strains with modifications in the lipid metabolism at the β -oxidation pathway (acyl-CoA oxidases) and the triglyceride hydrolysis (*LIP2* overexpression [3]). Lactone production was followed in batch and step-wise fed-batch cultures using castor oil as substrate in a 4 L bioreactor. The γ -decalactone production and degradation in the wild-type strain W29 (ATCC20460) and mutant strains MTLY40-2P (Δ *pox2-5*, *pPOX2-POX2*), JMY3010 (WT, *pTEF-LIP2*) will be reported. Depending on genotype, degradation of the γ -decalactone was prevented. Also, a faster initial rate of aroma production was obtained with strain overexpressing *LIP2* due to the fast hydrolysis of castor oil and release of ricinoleic acid. Step-wise fed-batch cultures improved γ -decalactone production only for MTLY40-2P strain, for which a 1.6-fold increase in γ -decalactone final concentration (7 g/L) was achieved.

- [1] Waché Y, Laroche C, Bergmark K, Moller-Andersen C, Aguedo M, Le Dall, M-T, Wang H, Nicaud JM, Belin JM. 2000. Involvement of Acyl Coenzyme A oxidase Isozymes in biotransformation of methyl ricinoleate into γ -decalactone by *Yarrowia lipolytica*. *Applied and Environmental Microbiology*. 66:1233-1236.
- [2] Waché Y, Aguedo M, Choquet A, Gatfield IL, Nicaud JM, Belin JM. 2001. Role of β -oxidation enzymes in γ -decalactone production by the yeast *Yarrowia lipolytica*. *Applied and Environmental Microbiology*. 67:5700-5704.
- [3] Pignède G., Wang, H., Fudalej F., Gaillardin C, Seman M. Nicaud J-M. 2000 Characterization of an extracellular lipase encoded by *LIP2* in *Yarrowia lipolytica*. *J. Bacteriol.* 182:2802-2810.