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Comparative study of pPOX2 and pLIP2 regulation in response to carbon source to in the oleaginous yeast, *Yarrowia lipolytica*

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In this study, the regulation of the promoter of the acycl-CoA oxidase gene 2 (pPOX2) and of the extracellular lipase 2 (pLIP2) was considered in regard to the medium composition and more precisely to the carbon source used. Promoter induction levels were measured using a reporter system based on a red fluorescent protein (DsRed). Specific fluorescence measurement revealed that pLIP2 is more strongly induced than pPOX2, especially in complex medium. More interestingly, higher levels of induction were obtained when a combination of glucose and oleic acid was used as carbon source compared to an oleic acid based medium. In order to define the optimal ratio of glucose/oleic acid to be used, several ratios of carbon sources have been tested for their induction potential. High induction level of pLIP2 was obtained when oleic acid fraction in the culture medium was in the range of 0.6-0.9 C-mol. Indeed, relative fluorescence was significantly increased in this range compared to the use of pure oleic acid. This result suggests that glucose can be considered as the most promising co-substrate to enhance pLIP2 induction and thus expression of any gene controlled by this promoter. In conclusion, this work provides alternative strategies to enhance pLIP2 induction and thus expression of pLIP2 dependent gene in Yarrowia lipolytica which increase the interest in this as a promising recombinant expression system.

Biography

Patrick Fickers has obtained his PhD from University of Liege, Belgium in 2004. He has worked as Post-doctorate at Polytech Lille, France and as a FNRS Fellow at the Centre of Protein Engineering, Liege, Belgium. He was an Associated Professor at Unversité libre de Bruxelles and the Head of the Biotechnology and Bioprocess Unit (2009-014). In January 2015, he has joined as a Professor the Microbial Processes and Interactions Research Unit (MiPI) at Gembloux AgroBiotech, University of Liege. He has published 37 research papers in peer-reviewed journals and 6 book chapters. His researches focus on the development of yeast and bacterial strains by metabolic engineering and on process development in bioreactor for the production of valuable compounds.

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