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### ***LIP2* promoter as a tool for high yield recombinants protein production in the yeast *Yarrowia lipolytica***

Non-conventional yeasts such as *Y. lipolytica* are considered as new cell factories for the production of recombinant proteins either at lab or industrial scale. Despite dozens of recombinant proteins have been successfully produced in this yeast, only a few expression vectors based on regulated promoters have been developed so far. Among them, promoters of key genes, namely *LIP2* and *POX2*, of *Yarrowia*'s unique hydrophobic substrates metabolism have been particularly considered. Despite they are even used at industrial scale, their fine regulation is not fully understood yet. Therefore, the characterization of their regulation in regards to cell physiology, and more interestingly in function of carbon metabolism, has been the focus of this work. Our methodology was based on gene expression profiling by mean of a DsRED-reporter system or by qPCR in regard to the carbon source of the culture medium (i.e. glucose, glycerol, oleic acid, alone or in combination). For co-substrate cultures, population heterogeneity was also investigated by flow cytometry at the level carbon source uptake and intracellular lipid accumulation. Our observations have highlighted that *Y. lipolytica* is able to consume simultaneously glucose and oleic acid and that cell population heterogeneity is more related to a continuum of different phenotypes of cells co-consuming both carbon sources rather than having two separate sub-populations leading to producing and non-producing phenotypes. Moreover, expression of *pLIP2* driven genes were more than ten-fold increase in medium containing glucose and oleic acid compared to pure hydrophobic substrate based medium.

### **Biography**

Patrick Fickers has completed a PhD in Biochemistry from University of Liège (Belgium). After a Post-doc at Polytech'Lille (France), he joined in 2005, the Centre of Protein Engineering (Liège, Belgium) as an FNRS Fellow. From 2009 until 2014, he was an Associated Professor at Université libre de Bruxelles and the Head of the Biotechnology and Bioprocess Unit. Since 2015, he is a Professor at Gembloux Agro BioTech, University of Liege, in the Microbial Processes. He has published more than 49 research papers in peer-reviewed journals, six book chapters and three patents. His researches focus on the development of yeast strains by metabolic engineering and on process development in bioreactor for the production of compounds of biotechnological interest.

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