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Gram-scale production of a fungal laccase in the host Aspergillus niger

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Abstract

We report on the heterologous expression in the filamentous fungus *Aspergillus niger* of a basidiomycetous laccase gene we routinely use as a mutagenesis platform to produce variants in *Saccharomyces cerevisiae*. The yield of recombinant laccase (LAC3 from Trametes sp C30) produced in *A. niger* is over 2 orders of magnitude higher than the best production of the same enzyme previously obtained in *S. cerevisiae* allowing us to routinely produce up to 840 mg/L of enzyme per culture in bioreactor and purify easily grams of recombinant laccase. The form produced in *A. niger* (Mw = 84 kDa) differs from that produced in *S. cerevisiae* (Mw = 94 kDa) in the extent of glycosylation (deglycosylated forms ≈ 60 kDa) and their apparent kinetic parameters whereas their spectroscopic signatures (UV-Visible, Electron Spin Resonance and circular dichroism) are substantially similar. This highlights the potential of using the LAC3 encoding sequence as a generic mutational platform in combination to the *S. cerevisiae* and *A. niger* expression systems for large productions of laccases variants.

Biography

Yasmina Mekmouche has completed her Ph.D at the age of 26 years from University Joseph Fourier in Grenoble (France) under the supervision of Pr. Marc Fontecave and Dr. Stéphane Ménage and postdoctoral studies from University of Minnesota with Pr. John D. Lipscomb and from Laboratoire de Chimie de Coordination in Toulouse (France) with Pr. Peter Faller. She is a research scientist at CNRS in Marseille since 2004 developing tools for catalysis based on chemical modification of metalloenzymes. She has published 18 papers in reputed journals.