Title:	Characterization of a mildly alkalophilic and thermostable recombinant Thermus thermophilus laccase with applications in decolourization of dyes
Authors:	Kumari, Arpana (/jspui/browse?type=author&value=Kumari%2C+Arpana) Kishor, Nitin (/jspui/browse?type=author&value=Kishor%2C+Nitin) Guptasarma, P. (/jspui/browse?type=author&value=Guptasarma%2C+P.)
Keywords:	Decolourization Delignification Oxidation Thermostable enzyme Thermus thermophilus laccase
Issue Date:	2018
Publisher:	Elsevier B.V.
Citation:	Biotechnology Letters, 40(2), pp. 285-295
Abstract:	Objective: To examine the potential for applications of TthLAC, a monomeric (~ 53 kDa) laccase encoded by the genome of Thermus thermophilus (strain HB 27) which can be produced at low cost in Escherichia coli. Result: Functional, thermostable and mildly alkalophilic TthLAC of high purity (> 90%) was produced through simple heating of suspended (TthLAC overexpressing) E.coli cells at 65 °C. For reactions of short duration (< 1 h) the temperature for optimal activity is ~ 90 °C. However, TthLAC undergoes slow partial unfolding and thermal inactivation above 65 °C, making it unsuitable for long incubations above this temperature. With different substrates, optimal function was observed from pH 6 to 8. With the substrate, ABTS, catalytic efficiency (Km) and maximum velocity (Vmax) at 60 °C and pH 6.0 were determined to be 2.4 × 103 μM and 0.04 × 103 μM/min respectively. Ultra-pure, affinity-purified TthLAC was used to confirm and characterize the enzyme's ability to oxidize known (laccase) substrates such as ABTS, syringaldazine and 4-fluoro-2-methylphenol. TthLAC decoloured up to six different industrial dyes, with or without the use of redox mediators such as ABTS. Conclusions: Unlike versatile laccases from most other sources, which tend to be thermolabile as well as acidophilic, TthLAC is a versatile, thermostable, mildly alkalophilic laccase which can be produced at low cost in E.coli for various redox applications.
URI:	https://link.springer.com/article/10.1007/s10529-017-2461-8 (https://link.springer.com/article/10.1007/s10529-017-2461-8) http://hdl.handle.net/123456789/2163 (http://hdl.handle.net/123456789/2163)
Appears in Collections:	Research Articles (/jspui/handle/123456789/9)

Files in This Item:

File	Description	Size	Format	
Need to add pdf.odt (/jspui/bitstream/123456789/2163/1/Need%20to%20add%20pdf.odt)		8.63 kB	OpenDocument Text	View/Open (/jspui/bitstream/12345

Show full item record (/jspui/handle/123456789/2163?mode=full)

(/jspui/handle/123456789/2163/statistics)