EuroSciCon

JOINT EVENT
3rd International Conference on
Digital Pathology
&
7th Global Summit on
Microbiology Research

August 13-14, 2018
Madrid, Spain

Abdelmageed M Othman et al., Arch Clin Microbiol 2018, Volume 9
DOI: 10.4172/1989-8436-C4-014

IMMOBILIZATION OF *MYCELIOPHTHORA THERMOPHILA* LACCASE ONTO IMMOBEAD 150P EPOXY SUPPORT: CHARACTERIZATION AND APPLICATION FOR WOOD HYDROPHOBIZATION

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Nowadays, extensive attention has been focused on laccases due to their broad substrate range which make them robust enzymes for application in different sectors. In the present study, *Myceliophthora thermophila* laccase was immobilized on both native and modified Immobead 150. Moreover, immobilizations were performed on both supports by one point and multipoint covalent attachment. From the different immobilized derivatives, the multipoint covalently immobilized laccase on the modified Immobead 150 (Amulti) showed the best results concerning the different immobilization parameters. Therefore, Amulti was evaluated for thermal and pH stabilities and was successfully applied for grafting a hydrophobic compound onto beech wood. Amulti has optimum temperature and pH at 70°C and 3.0, and retained 98 and 60% of activity after 2 h of exposure at 60 and 70°C, respectively. In alkaline conditions, Amulti has shown a remarkable stability, with 95% of initial activity at pH 9.0 after 3 h, although only 15% of initial activity could be recovered at pH 5.0 after 3 h. In addition, the immobilized laccase also showed good operational stability, maintaining 95% of its initial activity after 10 cycles of ABTS oxidation. The grafting of lauryl gallate (LG) with the assistance of Amulti was assessed by measuring the water contact angle. Grafted wood showed a relative contact angle of 81.1%, whereas the control (LG only) showed 28.6% after 4 mins of water addition on the wood surface. The results obtained make the immobilized laccase to be a promising tool for further biotechnological applications, especially in lignocellulosics modification.

Recent Publications

1. **Othman A M, González-Domínguez E, Sanromán Á, Correa-Duarte M and Moldes D (2016) Immobilization of laccase on functionalized multiwalled carbon nanotube membranes and application for dye decolorization. RSC Advances 6:114690–114697.**
2. **González-Domínguez E, Comesaña-Hermo M, Mariño-Fernández R, Rodríguez-González B, Arenal R, et al. (2016) Hierarchical nanoplatforms for high-performance enzyme biocatalysis under denaturing conditions. ChemCatChem 8:1264–1268.**
3. **Fernández-Fernández M, Sanromán M Á and Moldes D (2015) Wood hydrophobization by laccase-assisted grafting of lauryl gallate. J. Wood Chem. Technol. 35:156–165.**
4. **Mateo C, Grazu V, Palomo J M, Lopez-Gallego F, Fernandez-Lafuente R, et al. (2007) Immobilization of enzymes on heterofunctional epoxy supports. Nat. Protoc. 2:1022–1033.**
5. **Mateo C, Palomo J M, Fuentes M, Betancor L, Grazu V, et al. (2006) Glyoxyl agarose: A fully inert and hydrophilic support for immobilization and high stabilization of proteins. Enzyme Microb. Technol. 39:274–280.**

Biography

Abdelmageed M Othman has completed his PhD in Science (Microbiology) from Al-Azhar University (Cairo, Egypt) in 2012. He has three postdoctoral degrees for the stabilization and enhancement of laccase activity and its environmental applications, two of them (2013–2015) were at Bioengineering and Sustainable Processes Research Group, Chemical Engineering Department, Vigo University (Vigo, Spain), and one (2016) at the Department of Molecular Enzymology, Institute of Biochemistry and Biology, University of Potsdam, (Potsdam-Golm, Germany). He has participated in several Egyptian and international research projects and currently he is the Egyptian Principal Investigator of the Egyptian Science & Technology Development Fund (STDF) project in cooperation with Potsdam University, Germany. Nowadays, he is interested in production, purification and characterization of microbial enzymes and its stabilization through immobilization for different eco-friendly applications. He has published many research papers in reputable journals and has been serving as a Reviewer for different international journals.

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