

Isolation and Screening of Laccase Producing Basidiomycetes via Submerged Fermentations

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Abstract : Approximately 10,000 different types of dyes and pigments are being used in various industrial applications yearly, which include the textile and printing industries. However, these dyes are difficult to degrade naturally once they enter the aquatic system. Their high persistency in natural environment poses a potential health hazard to all form of life. Hence, there is a need for alternative dye removal strategy in the environment via bioremediation. In this study, fungi laccase is investigated via commercial agar dyes plates and submerged fermentation to explore the application of fungi laccase in textile dye wastewater treatment. Two locally isolated basidiomycetes were screened for laccase activity using media added with commercial dyes such as 2, 2'-azino-bis (3-ethylbenzothiazoline-6-sulfonic acid (ABTS), guaiacol and Remazol Brilliant Blue R (RBBR). Isolate TBB3 (1.70 ± 0.06) and EL2 (1.78 ± 0.08) gave the highest results for ABTS plates with the appearance of greenish halo on around the isolates. Submerged fermentation performed on Isolate TBB3 with the productivity 3.9067 U/ml/day, whereas the laccase activity for Isolate EL2 was much lower (0.2097 U/ml/day). As isolate TBB3 showed higher laccase production, it was subjected to molecular characterization by DNA isolation, PCR amplification and sequencing of ITS region of nuclear ribosomal DNA. After being compared with other sequences in National Center for Biotechnology Information (NCBI database), isolate TBB3 is probably from species *Trametes hirsutei*. Further research work can be performed on this isolate by upscale the production of laccase in order to meet the demands of the requirement for higher enzyme titer for the bioremediation of textile dyes.

Keywords : bioremediation, dyes, fermentation, laccase

Conference Title : ICBAE 2016 : International Conference on Biotechnology and Agricultural Engineering

Conference Location : Kuala Lumpur, Malaysia

Conference Dates : February 11-12, 2016