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Fungal laccase activity on degradation of CI Direct Blue 201 textile dye

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Textile dye effluent is one of the most toxic effluents released to the environment. Laccase enzyme has potential to degrade wide range of organic pollutants including textile dyes. Therefore, present study was designed to evaluate the potential applicability of crude laccase enzyme extracted from fungal strain; *Curvularia* sp., a previously identified laccase producing fungi, for decolorization of CI Direct Blue 201 (DB) textile dye. The *Curvularia* sp. was grown on rice grains with 50 mg/L DB dye, crude laccase enzyme was extracted to 50 mM of cold potassium phosphate buffer and partially purified by ammonium sulphate precipitation following dialyzing against the same buffer at 24 °C. A 5% of the extracted crude enzyme (120 U/ml of laccase) was added into 50 mg/L of DB dye (pH 7) and decolorization was observed by measuring the changes of the absorbance at 570 nm, using UV-Visible spectrophotometer. The laccase activity was determined measuring the 2,20-azino-bis (3-ethylbenzothiazoline-6-sulphonic acid) (ABTS) oxidation at 420 nm (ε_{420} = 36000 M^{-1} cm^{-1}). In the present study, 78% decolorization of dye was detected at 9 hrs of incubation at room temperature while control remained without detectable color change. The activity of the laccase enzyme before and after the dye decolorization was 120 (U/ml) and 55 (U/ml), respectively. The changes of the FTIR spectra indicated degradation of DB dye following the enzyme treatment. Thus, laccase enzyme, extracted from *Curvularia* sp., can be used as potential enzyme for removal of textile dye and further optimizations are required to enhance the decolorization process.

Keywords: textile dye, CI Direct Blue 201, decolorization, *Curvularia* sp. and laccase enzyme

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