ABSTRACT

The laccase enzyme synthesis by *Trichoderma viride* was studied using the submerged culture fermentation technique. The optimization study for laccase enzyme synthesis was carried out utilizing various fermentation settings and the OFAT (one factor at a time) technique. For laccase enzyme production, many parameters such as the effect of incubation temperature, pH, different carbon and nitrogen sources, and different micronutrient concentrations were detected for laccase Production. The maximum laccase enzyme yield was obtained with 4g sucrose, 5g yeast extract, 3g KH_2PO_4, 0.30g $FeSO_4$, $7H_2O$, 2g $MgSO_4$, $7H_2O$, 1.5g $CaCl_2$, 2.5g $CuSO_4$. The extracellular and intracellular activity of laccase was isolated from *Trichoderma viride* fungus. The maximal laccase production was 0.419 ± 0.019 U/mL for extracellular extract and 0.381 ± 0.008U/mL for intracellular extract after 5 days of fermentation at 30°C with all of the optimal culture medium ingredients. Through the chloroform extraction procedure, the laccase enzyme was partially purified. The purified laccase was assayed using spectrophotometer. The enzyme laccase was also characterized when it was purified. Temperature, pH, and substrate concentration were all varied to test the laccase enzyme. Laccase was shown to be temperature stable till 37°C and to have the highest activity at pH 6.0. The present study was also based on biotechnological application of laccase enzyme and it was found to be useful for the healthy growth of corn plant and the bioremediation of polluted water.