

## ABSTRACT

The present study was conducted on Bioconversion of Agro-industrial Wastes to Commercially Important Laccase under Solid State Fermentation. *Trichoderma viride* was used for the production of laccase enzyme by using solid state fermentation (SSF) technique. Effects of various parameters were tested on production of laccase enzyme such as incubation temperature and incubation time period, various agro industrial wastes and various concentration of spinach waste was detected on production of laccase enzyme. The results show that **15g** spinach waste gave the maximum production of laccase enzyme. The maximum production of laccase enzyme was observed as **0.394 ± 0.019U/ml** when pH **5.0** of fermentation medium at **35°C** was incubated for **9 days** with all the optimized culture medium ingredients. Optimization of laccase enzyme was done using one factor at a time (OFAT) technique using some parameters like effect of pH, temperature, substrate concentration, inhibitors and additives. Laccase enzyme extracted from *Trichoderma viride* was purified by precipitating the protein in ammonium sulfate followed by dialysis. The purified laccase was assayed using spectrophotometer. The yield of **0.394 ± 0.019 U/ml** laccase from *Trichoderma viride* proved to be the potential source for upscaling the cost effective and significant process. Laccase was applied industrially for various applications such as for the bioconversion of textile industrial wastes and their results indicate that the magnitude of decolourization of textile waste water was recorded as **51%**. Detoxification of industrial effluents by laccase is shown that using different concentrations of laccase on the detoxification of effluent on seedling growth of *Cicer arietinum*. In seedling growth shown maximum when laccase was using 100% and control shows no growth of seedlings of *Cicer arietinum*. Decolourization of leather dyeing waste water by laccase shown that crude laccase indicates **66%** of decolorization at the end of 1 day. The dye decolorization by the laccase shown maximum absorbance at **470nm** and phenol oxidation of petrol refinery wastewater by laccase enzyme shown that the removal of phenol by that experiment is greater than **58%**.