The present study focused on the surface culture fermentation approach used by *Fusarium oxysporum* to produce laccase utilising the OFAT (one factor at a Time) technique. The optimisation study for laccase synthesis was carried out utilising a variety of fermentation conditions. For the production of laccase, a number of characteristics, including the effect of incubation temperature, incubation period, pH, different carbon and nitrogen sources, and different concentrations of micronutrients, were observed. The maximum yield of laccase, according to the results, was produced by a mixture of 4g sucrose, 5g yeast extract, 2g KH_2PO_4, 0.1g $FeSO_4$, 0.5g $MgSO_4.7H_2O$, 2.5g $CaCl_2$, 0.5g $CuSO_4.5H_2O$ and 0.1g $ZnSO_4$. While maintaining the pH of the fermentation medium at 6.0 and temperature maintained at 30°C with all the optimised culture medium ingredients for 5 days, the maximum laccase production was observed as **0.523 ± 0.026** U/mL for extracellular extract and **0.498 ± 0.023** U/mL for intracellular extract. Through the use of the chloroform extraction technique, the laccase enzyme was partially purified. The enzyme's characterisation was also carried out after it had been purified. By adjusting the temperature, pH, and substrate concentration, the laccase was tested. It was found that laccase was stable up to a temperature of 37°C and that its activity peaked at a pH of 6.0. The quantitative determination of laccase was checked using TLC after characterisation. Using a spectrophotometer, the assay of pure laccase was carried out. Production of laccase by *Fusarium oxysporum* emerged as a possible source for scaling up the economical and long-lasting procedure. Laccase was used industrially in bioconversion of industrial textile wastes as well as decolorization of leather dyeing waste water.