

Fungus-Mediated Synthesis of magnetic nanoparticles for immobilisation of Pectolytic and xylanolytic enzymes

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Extended Abstract

In this study, superparamagnetic iron oxide nanoparticles (SPION) were synthesized using the filtrate of *Aspergillus flavus* exposed to Fe(III) and Fe(II) salts in aqueous solution. The extracellular synthesis of SPION was monitored by UV-Vis spectrophotometer and showed an absorption peak at 310 nm. The morphology of SPION was found to be flakes-like as confirmed by Field Emission Scanning Electron Microscopy (FESEM), while the average crystallite size was ~16 nm as determined through X-ray diffraction (XRD). Energy dispersive X-ray (EDX) analysis was performed to confirm the presence of elemental Fe in the sample. Pectinase and xylanase were covalently immobilized on SPION with efficiencies of approximately 84% and 77%, respectively. Compared to the free enzymes, the immobilized enzymes were found to exhibit enhanced tolerance to the variation of pH and temperature, and improved storage stability. Furthermore, the residual activity of immobilized enzymes was approximately 56% for pectinase and 52% for xylanase, after four and three consecutive cycles, respectively.