ABSTRACT

This work deals with biotransformation of L-tyrosine into L-dopa using tyrosinase obtained from wild-type ISL-9 of *Aspergillus oryzae*. The optimal L-dopa production was gathered by optimizing different parameters and by optimizing tyrosinase activity. The process parameters for attaining maximum fungal biomass such as glucose concentration (3-18%, w/v), time of incubation (12-96 h) and size of inoculum (2-12%, v/v) were optimized. A comparative study was done to enhance the tyrosinase activity. Enzyme activity was further enhanced by immobilizing the enzyme on poly (acrylamide-co-acrylic acid) hydrogels. Immobilization of intracellular tyrosinase on poly hydrogels was optimized by investigating enzyme concentration (0.05-0.3 ml/g), APS concentration (0.05- 0.3%, w/v) and procurement period (15-90 min). Maximum L-dopa production 2.26 mg/ml was achieved with 0.25 ml/g of enzyme concentration, 0.05%, w/v APS concentration and 30 min of procurement. Immobilization of tyrosinase enzyme on poly (acrylamide-co-acrylic acid) hydrogels was optimized which displayed 1.23-fold higher activity than free enzyme solution. The process conditions such as L-tyrosine concentration (1.25-7.5 mg/ml), L-ascorbic acid (Natural and Synthetic, 1-6 mg/ml) and pH of acetate buffer (3.0-4.5) were optimized. The highest L-dopa achieved was 2.29 mg/ml and 2.96 mg/ml using synthetic L-ascorbic acid for both free and immobilized enzyme, respectively. Tyrosinase immobilized on hydrogels exhibited thermostability at 44°C than of the free enzyme which was stable upto 37°C. Enzyme stability of immobilized enzyme against Tween-20, EDTA and SDS was also studied. Reusability, thermostability and storage stability of free enzyme solution were enhanced by immobilizing tyrosinase on poly (acrylamide-co-acrylic acid) hydrogels.