

ABSTRACT:

Tyrosinase encapsulated silica aerogel (TESA) was synthesized via an alcohol-free colloidal sol–gel route at room temperature and at neutral pH. Characterization on TESA indicated that 98% of enzyme was effectively loaded and located inside the aerogel network. TESA without solvent extraction showed higher tyrosinase activity than TESA extracted by amyl acetate/acetone (v/v:1/1). Stability of tyrosinase in TESA was enhanced towards extreme temperature, acidic and basic conditions. Optimization study indicates that 500 U enzyme/g silica aerogel; aged for 2 days, showed superior performance in the oxidation of catechol. The activity of TESA was remarkably enhanced; which was active at a wider temperature (up to 80 °C) and pH range (4–9). In contrast, free tyrosinase was totally inactive at these pH values and temperature >55 °C. TESA successfully removed about 90% of phenol in aqueous solution after 3 h of contact time with excellent reusability.