

Chitosan from Shrimp Head Waste as a Support for Trypsin Immobilization

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Chitosan is a partially deacetylated polysaccharide obtained from chitin, the main constituent of arthropod carapace. Shrimp head waste, as one of the major byproduct of the fishery processing industries, is an important low-cost source of chitin and chitosan. For its non-toxicity, biocompatibility, gel-forming properties and presence of reactive groups, chitosan is a suitable polymer for biotechnological approaches such as protein immobilization. The aim of this work was to obtain chitosan from shrimp processing waste and prepare a gel structure for trypsin covalent immobilization. Beads cross-linked with 0.5% glutaraldehyde and activated with 0.25% EDC yielded the best mechanical properties with a loading saturation of 6.288 μ g of protein per g chitosan. Optimum pH of immobilization was found to be 10.0 and time of immobilization of 2h. The enzyme activity and specific activity was 1.392U.mL⁻¹ and 11.069mU.mL⁻¹.mg⁻¹ protein, respectively. The reuses of immobilized enzyme showed more than 90% of initial activity after 10 enzyme assay cycles. Trypsin was covalently immobilized on chitosan beads with 22.3% of residual activity compared with the soluble enzyme. Immobilized trypsin onto chitosan can be used in proteolysis for food applications and purification of inhibitors. More studies are necessary for the better understanding of enzyme kinetic parameters and physical-chemical characteristics of the trypsin-chitosan particle.

Keywords: Chitosan, immobilization, shrimp waste, trypsin.

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