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Lipase immobilization on fibers grafted with polyglycidyl methacrylate

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Abstract

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Lipase enzyme originated from wheat germ was immobilized on nylon -6- grafted with polyglycidyl methacrylate (PGMA). The immobilization of enzyme experiments were designed and studied using face centred central composite design (FCCCD) under response surface methodology (RSM). Prior to immobilization, the polymer was activated with diethyl amine/ethanol to introduce an amine functional group to facilitate covalent bonding with the enzyme. The immobilized and free enzymes were characterized for effect of temperature and pH on enzyme activity, stability, storage and reusability as well as kinetics studies. ANOVA revealed that optimum lipase activity of 0.287 U/ml was achieved at immobilization time of 5 h, pH of 6 and 1.0 mg/ml for enzyme concentration. The optimum temperatures and pH for immobilized and free enzymes were 45 °C and 35 °C, and 8 and 7, respectively. The immobilized enzyme showed higher stability compared to free enzyme. The immobilized enzyme retained 18% of its activity after being recycled 8 times. In a storage stability test, immobilized lipase was able to retain 70% of its activity after being stored for 30 days, while free enzyme activity dropped to 15 % after 20 days of storage. © 2019, International Islamic University Malaysia-IIUM.

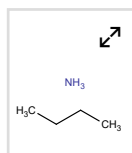
SciVal Topic Prominence [i](#)

Topic: Enzyme immobilization | Lipases | Cross-linked enzyme

Prominence percentile: 99.728 [i](#)

Chemistry database information [i](#)

Substances



Author keywords

[Enzyme](#) [FCCCD](#) [Fibers](#) [Immobilization](#) [Kinetics study](#) [Lipase](#) [Nylon](#) [Optimization](#) [Reusability](#)
[RSM](#) [Stability](#)

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