

Immobilization of Lipase Enzyme by Low Cost Material: A Statistical Approach

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Abstract : Immobilization of lipase enzyme produced from palm oil mill effluent (POME) by the activated carbon (AC) among the low cost support materials was optimized. The results indicated that immobilization of 94% was achieved by AC as the most suitable support material. A sequential optimization strategy based on a statistical experimental design, including one-factor-at-a-time (OFAT) method was used to determine the equilibrium time. Three components influencing lipase immobilization were optimized by the response surface methodology (RSM) based on the face-centered central composite design (FCCCD). On the statistical analysis of the results, the optimum enzyme concentration loading, agitation rate and carbon active dosage were found to be 30 U/ml, 300 rpm and 8 g/L respectively, with a maximum immobilization activity of 3732.9 U/g-AC after 2 hrs of immobilization. Analysis of variance (ANOVA) showed a high regression coefficient (R²) of 0.999, which indicated a satisfactory fit of the model with the experimental data. The parameters were statistically significant at $p < 0.05$.

Keywords : activated carbon, POME based lipase, immobilization, adsorption

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