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Title: Immobilization of Candida rugosa Lipase on Aminated Polyvinyl Benzyl Chloride-Grafted Nylon-6 Microfibers

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Abstract: This paper demonstrates a simplified procedure for the preparation of a nylon-6 microfibers based support for the immobilization of Candida rugosa lipase via covalent attachment to enhance the stability and reusability of lipase. The preparation of the support was done by radiation induced graft copolymerization (RIGC) of vinyl benzyl chloride (VBC) onto nylon-6 microfibers followed by amination with ethanolamine to facilitate the immobilization of lipase. Fourier transfer infra red (FTIR) and scanning electron microscope (SEM) were used to study the chemical and physical changes following grafting, amination and immobilization. Response surface methodology (RSM) was applied for the optimization of lipase immobilization on the aminated microfibers. The optimization parameters were incubation time, pH, and lipase concentration. Moreover, this study investigated the effect of temperature, pH, and storage stability and reusability on the lipase in its immobilized and free forms. The developed model from RSM showed an R-2 value of 0.9823 and P-value < 0.001 indicating that the model is significant. The optimum temperatures for both immobilized and free lipases were 45 degrees C, whereas the best pH values for lipase activity were at pH 8 and pH 7, respectively. This study also identifies values for K-M and V-max for both immobilized and free lipase accordingly. Based on the results, immobilized lipase had significantly improved the stability and reusability of lipase compared to that in free forms.

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