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# Immobilisation of candida rugosa lipase on aminated polyethylene /polypropylene microfibrous sheet modified with oxirane group (Article)

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## Abstract

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An active microfibrous substrate containing aminated brush obtained by radiation-induced grafting of glycidyl methacrylate (GMA) onto a polyethylene/polypropylene (PE/PP) micro fibrous sheet followed by amination reaction was prepared and used for immobilisation of Candida rugosa lipase under various conditions. The aminated microfibrous sheet was characterised by Fourier-transform infrared spectroscopy (FTIR-ATR) and field emission scanning electron microscope (FESEM). The amine group density on the aminated microfi- brous sheet was found to be 3.33mmol/g. Response surface methodology (RSM) was applied to model and optimise the immobilisation conditions including immobilisation time (2-6 h), medium pH (pH 7-9) and enzyme/support ratio (5.0-9.0mg/cm$^2$). The model generated from RSM was significantly correlated with the studied parameters for the residual activity of the immobilised lipase. The optimum values for immobilisation time, medium pH, and enzyme/support ratio were found to be 4.24h, pH 8, and 8.51mg/cm$^2$ respectively. The enzymatic activity using p-nitrophenyl palmitate (pNPP) as substrate was 1.4588U/cm$^2$ under optimum conditions. The pH endurance, storage, and thermal stability of the immobilised lipase were remarkably enhanced. The immobilised lipase can be readily recovered and more than 50% of its activity was

retained following 10 cycles. The results of this study suggested that the aminated microfibrous sheet of PE/PP grafted with poly(GMA) is a promising polymer support for enzyme immobilisation with high potential for broad biocatalytic applications. 

## SciVal Topic Prominence

Topic: Lipases | Enzyme immobilization | cross-linked enzyme

Prominence percentile: 99.656

## Reaxys Database Information

View Compounds

## Author keywords

Biocatalytic reactions | Candida rugosa lipase | Enzyme immobilisation | Oxirane group | Radiation induced grafting

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