Covalent Immobilization of Lipase AY on Poly (γ -Glutamic acid

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ABSTRACT

Industrial application of lipase requires efficient methods to immobilize theenzyme for yielding a biocatalyst with greater than free lipase. Lipase AY from Candida rugosa was immobilized on Celite by adsorption and poly γ -glutamic acid (γ PGA) by covalent binding, respectively. Response surface methodology (RSM) and 3-level-3-factor fractional factorial design were adopted to evaluate the effects of immobilization variables, such as immobilized time, temperature and enzyme/support ratio on specific activity of immobilization lipase. For lipase AY was immobilized on Celite by adsorption. The optimum immobilization conditions were: immobilization time 59.1 min, immobilization temperature 10.7 ° C, enzyme/support ratio 0.5 (w/w) and the highest specific activity was 18.2 U/mg-protein with activity yield 34.1%. In the study of covalent binding, lipase AY was immobilized on γ PGA using EDC as a activator. The optimum immobilization conditions were: immobilized time near to 2 h, immobilized temperature 0 ° C, enzyme/support ratio about 0.1 (w/w) and the highest specific activity was 96.4 U/mg-protein with activity yield 180.9%.The results showed that the lipase- γ PGA has better activity than lipase AY-Celite and free lipase AY and demonstrated the possible industrial application of lipase AY- γ PGA for yielding higher production.

Keywords : Adsorption ; Covalent binding ; Immobilization ; Lipase AY ; Optimzation ; Poly γ -glutamic acid.

Table of Contents

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