

## عنوان مقاله:

Kinetics and Isotherm Studies of the Immobilized Lipase on Chitosan Support

## محل انتشار:

ماهنامه بین المللی مهندسی، دوره 29، شماره 10 (سال: 1395)

تعداد صفحات اصل مقاله: 13

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## خلاصه مقاله:

The kinetics and isotherm studies of the immobilized lipase and the mechanism of immobilization on chitosan beads and activated chitosan beads with glutaraldehyde were investigated. The validity of experimental data fitted to Langmuir, Freundlich, Hill, Sips, Temkin, Redlich-Paterson and Dubinin-Radushkevich isotherm models for both immobilization methods were examined. The isotherm models were compatible and confirmed immobilization techniques. In comparing of the isotherm models, the best fit of experimental data was obtained by Langmuir isotherm model for chitosan beads; which is consistent with the heterogeneous behavior of the adsorption sites on the chitosan structure. However, Freundlich isotherm model have corresponded immobilization of lipase on chitosan beads activated by glutaraldehyde so that it can reveal the multilayer adsorption. Also, pseudo-first order, pseudo-second order, Elovich and intra-particle diffusion were studied by experimental results in different concentration of lipase. Pseudo-first order kinetic model were described immobilization of lipase on chitosan beads and corresponds to physical adsorption of enzyme on the carrier. In fact, activated beads have followed pseudo-second order kinetic model which is indicated that chemical adsorption of enzyme occurred in the carrier. In addition, intra-particle diffusion equation for chitosan beads and activated chitosan beads is properly fitted by experimental data with high regression coefficient. In addition, FESEM analysis of chitosan beads and activated chitosan beads demonstrated that glutaraldehyde has significantly enhanced the surface porosity of chitosan beads. Maximum capacity of immobilization was enhanced by 2 folds, when the porosity of chitosan beads were improved by glutaraldehyde. These results were confirmed with adsorption isotherm models and kinetic equations.

## کلمات کلیدی:

Adsorption Isotherms Kinetic Studies Chitosan Beads Lipase Glutaraldehyde

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