

Immobilized enzymes

ABSTRACT

The use of immobilized enzymes as biocatalysts in organic syntheses is of increasing interest. Immobilized enzymes are enzymes attached to carries via physical or chemical interactions, thus making them to be easily handled as compared to their soluble counterparts. The first part of the chapter outlines the advantages immobilization, different immobilization techniques, types of supports and the uses of immobilized enzymes. The latter part of the chapter reviews our work in immobilizing lipase onto various supports. Types of supports that have been studied are hydrophobic, hydrophilic, advanced material and natural supports. The immobilized lipases prepared onto different supports were characterized in term of their activity, thermostability and enantioselectivity. Hydrophobic exhibited relatively higher activities when immobilized on the more polar polymers (Amberlite XAD7, XAD8 and RCOH). The activities of immobilized lipase onto hydrogels were increased when the hydrophilicity was increased. Immobilization onto synthetic clay-like material of hydrotalcite (Mg/Al) gave high activity and enantioselectivity. The use of the hydrotalcite intercalated with Sodium Dodecyl sulfate (SDS) showed an increase in adsorption of lipase as well as the lipase activity. Immobilized lipase onto inexpensive natural kaolin exhibited increased activity by four fold when compared to native lipase.

Keyword: Enzymes; Immobilized enzymes; Lipases