

Thesis Title	Effect of Organic Solvents on Activity of <i>Penicillium roqueforti</i> Lipase Immobilized on Rice Hull Ash
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Abstract

Rice hull ash was used as a support for immobilization of lipase in various organic solvents by adsorption. Enzyme immobilization was carried out by direct addition of enzyme solution onto rice hull silica suspended in organic solvents. The rate of enzyme addition was critical and controlled by a home made syringe pump. Rice hull ash was heated in a muffle furnace at 500 °C for 2 hours and the ash was treated with 10% (v/v) sulfuric acid and washed with water until neutral. The amount of water was controlled at the enzyme solubilization step before immobilization.

The effects of organic solvents on the catalytic activity of the immobilized lipase from *Penicillium roqueforti* were determined by rate of hydrolysis of olive oil. Lipase immobilized on rice hull silica gave higher hydrolysis activities in solvents having log P values greater than 3, such as nonane (log P 5.1), octane (log P 4.5), isooctane (log P 4.5), heptane (log P 4.0) and hexane (log P 3.5). Activities of the immobilized lipase were 80.26, 97.36, 78.86, 74.09 and 66.52 % of the free lipase respectively. However the enzymatic activity decreased with increasing water content. Activities of the lipase in aromatic hydrocarbons and chlorinated hydrocarbons were very low or negligible but those in ethers were low activities. Among water miscible solvents tested, acetone gave the highest activity.

The stability of the immobilized lipase in nonane was higher than other aliphatic hydrocarbons. The percent of hydrolysis of enzyme suspended in isooctane were 44.39% in 40 hrs when olive oil (4% v/v) was used as substrate.

Keywords : adsorption / enzyme in organic solvent / hydrolysis / immobilization / lipase
/ rice hull ash