

Chonnikan Tansuriyavong 2007: Modification of Poly(arylene ether sulfone) for Lipase Covalent Immobilization for Biodiesel Production. Master of Engineering (Chemical Engineering), Major Field: Chemical Engineering, Department of Chemical Engineering. Thesis Advisor: Assistant Professor Nanthiya Hansupalak, Ph.D. 111 pages.

The aim of this research was to study 2 kinds of Poly(arylene ether sulfone) modified with amine group used to immobilize lipase with covalent bond. The aminated polymer was activated with glutaraldehyde. The effects of glutaraldehyde concentration and activated time were investigated. Also, the effect of temperature on lipase activity, and the effects of temperature and pH on immobilized lipase were studied. And the distribution of enzyme on membrane surface was confirmed with Scanning Electron Microscopy and Atomic Force Microscopy. In addition, The stability of immobilized enzyme on pH and temperature were investigated. Finally, The immobilized lipase obtained from the optimal conditions was characterized and used as a catalyst compared with free enzyme in the transesterification reaction for biodiesel production. From this experiment, it was found that the immobilized lipase on aminated polyphenylsulfone gave the highest activity yield of 97.45 % with the glutaraldehyde concentration is 0.075 %w/v and activated for 2 hours at 30 oC, then immobilized with lipase concentration 140 mg/ml in phosphate buffer solution that have ionic strength 0.05 M, pH 7 at 37 oC for 3 hours. The stability on pH and temperature were found to increase with immobilization. When the 5% weight immobilized lipase was used as a catalyst for biodiesel production from jatropha oil, the methyl ester content obtained was 11.15 %. In the case of using free lipase, the methyl ester content production was 9.13 %.

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Thesis Advisor's signature

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