

## **Production of biodiesel from palm oil using liquid core lipase encapsulated in kappa-carrageenan**

### **Abstract**

This work deals with the enzymatic transesterification of palm oil with methanol in a solvent-free system. Among the five lipases tested in the initial screening, lipase PS from *Burkholderia cepacia* resulted in the highest triglyceride conversion. Lipase PS was further investigated in a novel immobilized form by encapsulating within a biopolymer, kappa-carrageenan. Using the immobilized lipase the production parameters of biodiesel from palm oil were optimized. The optimal conditions for processing 10 g of palm oil was: 30 degrees C, 1:7 oil/methanol molar ratio, 1 g water, 5.25 g immobilized lipase, 72 h reaction time and 23.7g relative centrifugal force. At the optimal conditions, triglyceride conversion of up to 100% could be obtained. The immobilized lipase was stable and retained 82% relative transesterification activity after five cycles. Liquid core lipase encapsulated in kappa-carrageenan could be a potential immobilized catalyst for eco-friendly production of biodiesel. (C) 2010 Elsevier Ltd. All rights reserved.