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Waste and Biomass Valorization

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## Statistical Optimization of Ethanol-Based Biodiesel Production from Sludge Palm Oil Using Locally Produced *Candida cylindracea* Lipase (Article)

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### Abstract

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Face centered central composite design was used to optimize the enzyme loading, reaction temperature and mixing speed of sludge palm oil (SPO) transesterification reaction using locally produced *Candida cylindracea* lipase. The developed quadratic model was found to be significant at  $p < 0.05$ . The highest biodiesel yield of 57.5 % (w/w SPO) and 15.22 % free fatty acids (FFA) conversion to biodiesel with coefficient of determination  $R^2$  of 0.91 and 0.93, respectively were obtained at enzyme loading of 0.4 U/g SPO, 41 °C and 250 rpm mixing speed. Enzyme loading (U/g) gave little effect on the %FFA conversion to biodiesel and total biodiesel yield compared to temperature and mixing speed due to high FFA and water content, thus further studies are required for improvement. The study shows the low cost SPO and locally produced lipase have a promising potential in the utilization of waste for low cost biodiesel production. © 2015, Springer Science+Business Media Dordrecht.

### SciVal Topic Prominence

Topic: Biodiesel | Lipases | immobilized lipase

Prominence percentile: 97.398 

### Author keywords

[Biodiesel](#) [Free fatty acid](#) [Lipase](#) [Optimization](#) [Sludge palm oil](#)

### Indexed keywords

Engineering controlled terms:

[Biodiesel](#) [Candida](#) [Enzymes](#) [Fatty acids](#) [Lipases](#) [Mixing](#) [Oil shale](#) [Optimization](#)  
[Palm oil](#) [Yeast](#)

Engineering uncontrolled terms

[Candida cylindracea lipase](#) [Central composite designs](#) [Coefficient of determination](#)  
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Supreme Prosecutors' Office		SPO	Kinetics of liquid lipase NS81006-catalyzed alcoholysis of oil for biodiesel production
International Islamic University Malaysia			Lü, L. , Du, W. , Liu, D. (2012) <i>Cuihua Xuebao/Chinese Journal of Catalysis</i>

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