

Document details

[< Back to results](#) | 1 of 1[Export](#) [Download](#) [Print](#) [E-mail](#) [Save to PDF](#) [Add to List](#) [More... >](#)[View at Publisher](#)Waste and Biomass Valorization
Volume 7, Issue 1, 1 February 2016, Pages 87-95Statistical Optimization of Ethanol-Based Biodiesel Production from Sludge Palm Oil Using Locally Produced *Candida cylindracea* Lipase (Article)Nasaruddin, R.R.^a, Alam, M.Z.^a, Jami, M.S.^a, Salihu, A.^{a,b} ^aDepartment of Biotechnology Engineering, Bioenvironmental Engineering Research Centre (BERC), International Islamic University Malaysia, Kuala Lumpur, 50728, Malaysia^bDepartment of Biochemistry, Ahmadu Bello University, Zaria, Nigeria

Abstract

[View references \(33\)](#)

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](#)
[Free fatty acid](#) [Sludge PALM Oil](#) [Sludge palm oil \(SPO\)](#) [Statistical optimization](#)
[Transesterification reaction](#)

Engineering main heading:

[Loading](#)

Funding details

Metrics  [View all metrics >](#)2 Citations in Scopus
15th percentile
0.21 Field-Weighted
Citation ImpactPlumX Metrics Usage, Captures, Mentions,
Social Media and Citations
beyond Scopus.

Cited by 2 documents

Evaluation of Sludge Palm Oil as Feedstock and Development of Efficient Method for its Utilization to Produce Polyhydroxyalkanoate
Thinakaran, L. , Sudesh, K.
(2019) *Waste and Biomass Valorization*

Lipases as biocatalyst for biodiesel production

Vargas, M. , Niehus, X. , Casas-Godoy, L.
(2018) *Methods in Molecular Biology*

[View all 2 citing documents](#)

Inform me when this document is cited in Scopus:

[Set citation alert >](#)[Set citation feed >](#)

Related documents

Evaluation of solvent system for the enzymatic synthesis of ethanol-based biodiesel from sludge palm oil (SPO)

Nasaruddin, R.R. , Alam, M.Z. , Jami, M.S.
(2014) *Bioresour Technol*

Performance of sludge palm oil combustion using waste oil

Funding sponsor	Funding number	Acronym	burner
Ministry of Higher Education and Scientific Research	ERGS-11-002-0002		Zuber, M.A. , Ithnin, A.M. , Yahya, W.J. (2018) <i>Journal of Advanced Research in Fluid Mechanics and Thermal Sciences</i>
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>

Funding text

The authors would like to thank the staff of Sime Darby Research Sdn. Bhd. for supplying the SPO and to the Department of Biotechnology Engineering, International Islamic University Malaysia (IIUM) for providing the facilities in the research. This research was funded by the Ministry of Higher Education using Exploratory Research Grant Scheme (ERGS-11-002-0002).

View all related documents based on references

Find more related documents in Scopus based on:

Authors > Keywords >

ISSN: 18772641

Source Type: Journal

Original language: English



DOI: 10.1007/s12649-015-9424-x

Document Type: Article

Publisher: Springer Netherlands

References (33)

[View in search results format >](#)

All [Export](#)  Print  E-mail [Save to PDF](#) [Create bibliography](#)

- 1 Bajaj, A., Lohan, P., Jha, P.N., Mehrotra, R.
Biodiesel production through lipase catalyzed transesterification: An overview

(2010) *Journal of Molecular Catalysis B: Enzymatic*, 62 (1), pp. 9-14. Cited 270 times.
doi: 10.1016/j.molcatb.2009.09.018

[View at Publisher](#)

- 2 Atadashi, I.M., Aroua, M.K., Abdul Aziz, A.R., Sulaiman, N.M.N.
High quality biodiesel obtained through membrane technology

(2012) *Journal of Membrane Science*, 421-422, pp. 154-164. Cited 34 times.
doi: 10.1016/j.memsci.2012.07.006

[View at Publisher](#)

- 3 Wang, Y., Wang, X., Liu, Y., Ou, S., Tan, Y., Tang, S.
Refining of biodiesel by ceramic membrane separation

(2009) *Fuel Processing Technology*, 90 (3), pp. 422-427. Cited 92 times.
doi: 10.1016/j.fuproc.2008.11.004

[View at Publisher](#)

- 4 Moser, B.R.
Influence of blending canola, palm, soybean, and sunflower oil methyl esters on fuel properties of biodiesel

(2008) *Energy and Fuels*, 22 (6), pp. 4301-4306. Cited 160 times.
doi: 10.1021/ef800588x

[View at Publisher](#)