



< Back to results | < Previous 2 of 3 Next >

Download Print E-mail Save to PDF Add to List More... >

Materials Today: Proceedings • Open Access • Volume 63, Pages S490 - S495 • January 2022

Document type

Article • Hybrid Gold Open Access

Source type

Journal

ISSN

22147853

DOI

10.1016/j.matpr.2022.04.527

Publisher

Elsevier Ltd

Original language

English

View less ^

Biodiesel production from waste cooking oil: A brief review

Suzihaque M.U.H.^{a, b}; Alwi, Habsah^{a, b}; Kalthum Ibrahim, Ummi^{a, b}; Abdullah, Sureena^c; Haron, Normah^d

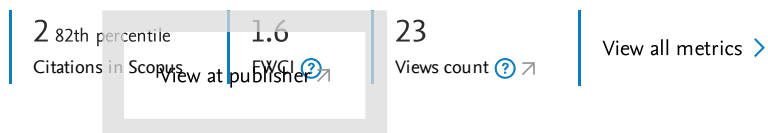
Save all to author list

^a School of Chemical Engineering, College of Engineering, Universiti Teknologi MARA, Selangor, Shah Alam, 40450, Malaysia

^b Food Process and Engineering Research Group (FOPERG), Universiti Teknologi MARA, Selangor, Shah Alam, 40450, Malaysia

^c Faculty of Chemical Engineering and Technology, Universiti Malaysia Pahang, Pahang, Gambang, 26300, Malaysia

^d Department of Biotechnology Kuliyyah of Science, International Islamic University of Malaysia, Pahang, Kuantan, 25200, Malaysia



View PDF Full text options ^ Export v

Abstract

Author keywords

Indexed keywords

Sustainable Development Goals 2022

SciVal Topics

Metrics

Funding details

Cited by 2 documents

Optimization using response surface methodology for producing biodiesel from waste cooking oil using fishbone catalyst | Optimierung der Produktion von Biodiesel aus Altspeiseöl mit einem Fischgräten-Katalysator durch die Antwortflächenmethode

Maqsood, K. , Alsaady, M. (2022) *Materialwissenschaft und Werkstofftechnik*

Evaluation and optimization of engine performance and exhaust emissions of a diesel engine fueled with diestrol blends

Rafiee, S. , Shabani, Z. , Khoshnevisan, B. (2022) *Environmental Progress and Sustainable Energy*

View all 2 citing documents

Inform me when this document is cited in Scopus:

Set citation alert >

Related documents

Optimization of temperature and molar flow ratios of triglyceride/alcohol in biodiesel production in a batch reactor

Jafari, D. , Esfandiyari, M. (2020) *Biofuels*

Biodiesel from Waste Cooking Oil

Bhadana, B. , Tyagi, R.D. (2019) *Biodiesel Production: Technologies, Challenges, and Future Prospects*

Transesterification of vegetable oil to biodiesel fuel using alkaline catalyst

Keera, S.T. , El Sabagh, S.M. , Taman, A.R. (2011) *Fuel*

View all related documents based on references

Find more related documents in Scopus based on:

Authors > Keywords >

Abstract

Biodiesel is a source of new renewable energies and a substitute fuel with much potential in the future for petroleum-derived diesel. According to BP Statistical Review of World Energy, total global consumption of diesel from petroleum increasing in one decade which is 3.5 million tonnes in 2010 and 3.9 million tonnes in 2019. Despite reducing the dependence on fossil fuel, the question of how waste cooking oil (WCO) disposal and related environmental damage issues might be solved by biodiesel production. In Malaysia, an estimated 540 000 tonnes of WCO from vegetable and animal fats are discarded each year without being treated as wastes. WCO recognize as a raw material for biodiesel process and have a great potential. Biodiesel is made through a reaction between triglyceride and alcohol, with triglyceride being a raw material found primarily in plants and animals. Transesterification is the popular process of biodiesel production with low cost and mild reactions conditions. Some studies have done on the variable of transesterification process with the optimum condition of biodiesel production from WCO. This study examines WCO as a raw material for biodiesel production, including the various variables of transesterification process and a comparison of WCO biodiesel and petroleum diesel. © 2022

Author keywords

Biodiesel ; Physicochemical Properties; Transesterification; Waste Cooking Oil

Indexed keywords

Engineering controlled terms

Animals; Diesel engines; Fossil fuels; Gasoline; Oils and fats; Physicochemical properties; Transesterification; Waste disposal

Engineering uncontrolled terms

Biodiesel production ; Global consumption; Physicochemical property; Renewable energies; Statistical reviews; Substitute fuels; Transesterification process; Transesterifications; Waste cooking oil ; World energies

Engineering main heading

Biodiesel

Sustainable Development Goals 2022 📄 New

Sustainable Development Goals mapped to this document

Affordable and clean
energy
Goal 7

SciVal Topics 📄

Metrics

Funding details


References (52)


[View in search results format >](#)

All

Export

 Print

 E-mail

 Save to PDF

Create bibliography

- 1 Yaakob, Z., Mohammad, M., Alherbawi, M., Alam, Z., Sopian, K.
Overview of the production of biodiesel from Waste cooking oil
(2013) *Renewable and Sustainable Energy Reviews*, 18, pp. 184-193. Cited 408 times.
doi: 10.1016/j.rser.2012.10.016
-
- 2 Hosseini, M., Nikbakht, A.M., Tabatabaei, M.
Biodiesel production in batch tank reactor equipped to helical ribbon-like agitator ([Open Access](#))
(2012) *Modern Applied Science*, 6 (3), pp. 40-46. Cited 17 times.
<http://www.ccsenet.org/journal/index.php/mas/article/download/13639/10235>
doi: 10.5539/mas.v6n3p40
-
- 3 (2020)
BP, "Statistical Review of World Energy," [Online]. Available:
<https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2020-full-report.pdf>
-
- 4 Ahmad, A.L., Yasin, N.H.M., Derek, C.J.C., Lim, J.K.
Microalgae as a sustainable energy source for biodiesel production: A review
(2011) *Renewable and Sustainable Energy Reviews*, 15 (1), pp. 584-593. Cited 766 times.
doi: 10.1016/j.rser.2010.09.018
-
- 5 Fazal, M.A., Haseeb, A.S.M.A., Masjuki, H.H.
Biodiesel feasibility study: An evaluation of material compatibility; Performance; emission and engine durability
(2011) *Renewable and Sustainable Energy Reviews*, 15 (2), pp. 1314-1324. Cited 357 times.
doi: 10.1016/j.rser.2010.10.004
-
- 6 Balat, M., Balat, H.
Progress in biodiesel processing
(2010) *Applied Energy*, 87 (6), pp. 1815-1835. Cited 617 times.
<http://www.elsevier.com/inca/publications/store/4/0/5/8/9/1/index.htm>
doi: 10.1016/j.apenergy.2010.01.012
-
- 7 Meng, X., Chen, G., Wang, Y.
Biodiesel production from waste cooking oil via alkali catalyst and its engine test
(2008) *Fuel Processing Technology*, 89 (9), pp. 851-857. Cited 331 times.
doi: 10.1016/j.fuproc.2008.02.006
-

- 8 Topare, N.S., Patil, K.D., Khedkar, S.V.
Effects of operating parameters on biodiesel production from waste cooking oil under ultrasonic irradiation
(2021) *Materials Today: Proceedings*, Part 20 46, pp. 10638-10641. Cited 3 times.
<https://www.sciencedirect.com/journal/materials-today-proceedings>
doi: 10.1016/j.matpr.2021.01.379
-
- 9 Alias, N.I., Javendra, K., Shahrom, M.Z.
(2018), 30 (2), pp. 79-83. Cited 12 times.
"Characterization of waste cooking oil for biodiesel production," J. Kejuruter., [Online]. Available:
<http://www.kyoto-kem.com/en/pdf/industry/FatVegetableOil/ETIB-99307.pdf>
-
- 10 Ganesan, K., Sukalingam, K., Xu, B.
Impact of consumption of repeatedly heated cooking oils on the incidence of various cancers- A critical review
(2019) *Critical Reviews in Food Science and Nutrition*, 59 (3), pp. 488-505. Cited 32 times.
<https://www.tandfonline.com/loi/bfsn20>
doi: 10.1080/10408398.2017.1379470
-
- 11 Kheang, L.S., May, C.Y., Foon, C.S.I.T.
Recovery and Conversion of Palm Olein-Derived Used Frying Oil To Methyl Esters for Biodiesel
(2006) *J. Oil*, 18, pp. 247-252. Cited 57 times.
-
- 12 Haruhiro, F., Wataru, I., Katsuyuki, N., Joko, P., Hiroe, T., Genshiro, K.
(2015), 9.
"A Comparative Study of Waste Cooking Oil Recycling Programs in Bogor and Niigata Cities and GHG Emission Reduction by Recycling." Proc. 2015 AASRI Int. Conf. Circuits Syst., no. January doi: 10.2991/cas-15.2015.41.
-
- 13 Zhang, W., Ji, H., Song, Y., Ma, S., Xiong, W., Chen, C., Chen, B., (...), Zhang, X.
Green preparation of branched biolubricant by chemically modifying waste cooking oil with lipase and ionic liquid
(2020) *Journal of Cleaner Production*, 274, art. no. 122918. Cited 37 times.
<https://www.journals.elsevier.com/journal-of-cleaner-production>
doi: 10.1016/j.jclepro.2020.122918
-
- 14 Azmi, Z.
Malaysians use too much cooking oil
(2019) *The Moles*
<https://www.mole.my/malaysians-use-too-much-cooking-oil/>
-

- 15 Tsai, W.-T.
Mandatory recycling of waste cooking oil from residential and commercial sectors in Taiwan (Open Access)

(2019) *Resources*, 8 (1), art. no. 38. Cited 39 times.
www.mdpi.com/journal/resources
doi: 10.3390/resources8010038
-
- 16 Kharina, A., Searle, S., Rachmadini, D., Kurniawan, A.A.
(2018)
"The potential economic, health and greenhouse gas benefits of incorporating used cooking oil into Indonesia's biodiesel," White Pap., no. September [Online]. Available:
https://theicct.org/sites/default/files/publications/UCO_Biodiesel_Indonesia_20180919.pdf
-
- 17 Mohammed, A.R., Bhargavi, R.
(2015), 7 (12), pp. 670-681. Cited 57 times.
"Biodiesel production from waste cooking oil," *J. Chem. Pharm. Res.*, doi: 0975-7384.
-
- 18 Cordero-Ravelo, V., Schallenberg-Rodriguez, J.
Biodiesel production as a solution to waste cooking oil (WCO) disposal. Will any type of WCO do for a transesterification process? A quality assessment

(2018) *Journal of Environmental Management*, 228, pp. 117-129. Cited 54 times.
<http://www.elsevier.com/locate/jenvman>
doi: 10.1016/j.jenvman.2018.08.106
-
- 19 Gaur, A., Mishra, S., Chowdhury, S., Baredar, P., Verma, P.
A review on factor affecting biodiesel production from waste cooking oil: An Indian perspective

(2020) *Materials Today: Proceedings*, Part 11 46, pp. 5594-5600. Cited 12 times.
<https://www.sciencedirect.com/journal/materials-today-proceedings>
doi: 10.1016/j.matpr.2020.09.432
-
- 20 Zahan, K.A., Kano, M.
Biodiesel production from palm oil, its by-products, and mill effluent: A review (Open Access)

(2018) *Energies*, 11 (8), art. no. 2132. Cited 143 times.
<http://www.mdpi.com/1996-1073/11/8/2132/pdf>
doi: 10.3390/en11082132
-
- 21 Khalisanni, K., Khalizani, K., Rohani, M.S., Khalid, P.O.
(2008), 2 (2), pp. 81-83. Cited 23 times.
"Analysis of Waste Cooking Oil as Raw Material for Biofuel Production," *Glob. J. Environ. Res.*, [Online]. Available:
<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.414.3929&rep=rep1&type=pdf>
-

- 22 Foroutan, R., Esmaili, H., Mousavi, S.M., Hashemi, S.A., Yeganeh, G.
The physical properties of biodiesel-diesel fuel produced via transesterification process from different oil sources
(2019) *Physical Chemistry Research*, 7 (2), pp. 415-424. Cited 8 times.
http://www.physchemres.org/article_87601_88a09f3a1b8ce0e9f25ef98ffe3dbf07.pdf
doi: 10.22036/pcr.2019.173224.1600
-
- 23 Oa, A., Ao, A., Se, A.
(2019) , pp. 1-10.
"Process Parameter Estimation of Biodiesel Production from Waste Frying Oil (Vege table and P alm oil) using Homogeneous Catalyst Processing & Technology," *J. Food Process. Technol.*,, doi: 10.35248/2157-7110.19.10.811.Copyright.
-
- 24 Al-Saadi, A., Mathan, B., He, Y.
Biodiesel production via simultaneous transesterification and esterification reactions over SrO–ZnO/Al₂O₃ as a bifunctional catalyst using high acidic waste cooking oil
(2020) *Chemical Engineering Research and Design*, 162, pp. 238-248. Cited 34 times.
http://www.elsevier.com/aps/findingjournaldescription.cws_home/713871/description#description
doi: 10.1016/j.cherd.2020.08.018
-
- 25 Farooq, M., Ramli, A.
Biodiesel production from low FFA waste cooking oil using heterogeneous catalyst derived from chicken bones
(2015) *Renewable Energy*, 76, pp. 362-368. Cited 223 times.
<http://www.journals.elsevier.com/renewable-and-sustainable-energy-reviews/>
doi: 10.1016/j.renene.2014.11.042
-
- 26 Said, N.H., Ani, F.N., Said, M.F.M.
Review of the production of biodiesel from waste cooking oil using solid catalysts (Open Access)
(2015) *Journal of Mechanical Engineering and Sciences*, 8, pp. 1302-1311. Cited 42 times.
http://jmes.ump.edu.my/images/Volume%208%20June%202015/5_Said%20et%20al.pdf
doi: 10.15282/jmes.8.2015.5.0127
-
- 27 Nomanbhay, S., Hussein, R., Ong, M.Y.
Sustainability of biodiesel production in Malaysia by production of bio-oil from crude glycerol using microwave pyrolysis: A review (Open Access)
(2018) *Green Chemistry Letters and Reviews*, 11 (2), pp. 135-157. Cited 55 times.
<http://www.tandf.co.uk/journals/titles/17518253.asp>
doi: 10.1080/17518253.2018.1444795

- 28 Sharma, Y.C., Singh, B.
Development of biodiesel from karanja, a tree found in rural India
(2008) *Fuel*, 87 (8-9), pp. 1740-1742. Cited 194 times.
doi: 10.1016/j.fuel.2007.08.001
-
- 29 Adewale, P., Dumont, M.-J., Ngadi, M.
Recent trends of biodiesel production from animal fat wastes and associated production techniques
(2015) *Renewable and Sustainable Energy Reviews*, 45, pp. 574-588. Cited 209 times.
<https://www.journals.elsevier.com/renewable-and-sustainable-energy-reviews>
doi: 10.1016/j.rser.2015.02.039
-
- 30 (2013)
S. Y.M, D. W.M.A.W, and A. A. A.R, "Successes, Challenges and Prospects," in *Biodiesel Feedstock and Production Technologies*, Intech Open Science.
-
- 31 Atabani, A.E., Silitonga, A.S., Badruddin, I.A., Mahlia, T.M.I., Masjuki, H.H., Mekhilef, S.
A comprehensive review on biodiesel as an alternative energy resource and its characteristics
(2012) *Renewable and Sustainable Energy Reviews*, 16 (4), pp. 2070-2093. Cited 1218 times.
doi: 10.1016/j.rser.2012.01.003
-
- 32 Ekkpowpan, P., Arpornpong, N., Charoensaeng, A., Khaodhiar, S.
(2014) , pp. 610-614.
"Life Cycle Assessment of Biofuel from Microemulsion and Transesterification Processes," doi: 10.15242/ie.e0314051.
-
- 33 Demirbas, A.
Progress and recent trends in biodiesel fuels
(2009) *Energy Conversion and Management*, 50 (1), pp. 14-34. Cited 1483 times.
doi: 10.1016/j.enconman.2008.09.001
-
- 34 Patil, P., Deng, S., Isaac Rhodes, J., Lammers, P.J.
Conversion of waste cooking oil to biodiesel using ferric sulfate and supercritical methanol processes
(2010) *Fuel*, 89 (2), pp. 360-364. Cited 140 times.
<http://www.journals.elsevier.com/fuel/>
doi: 10.1016/j.fuel.2009.05.024
-

- 35 Cunha, A., Feddern, V., De Prá, M.C., Higarashi, M.M., De Abreu, P.G., Coldebella, A.
Synthesis and characterization of ethylic biodiesel from animal fat wastes ([Open Access](#))
(2013) *Fuel*, 105, pp. 228-234. Cited 85 times.
doi: 10.1016/j.fuel.2012.06.020
-
- 36 Baskar, G., Aberna Ebenezer Selvakumari, I., Aiswarya, R.
Biodiesel production from castor oil using heterogeneous Ni doped ZnO nanocatalyst
(2018) *Bioresource Technology*, 250, pp. 793-798. Cited 181 times.
www.elsevier.com/locate/biortech
doi: 10.1016/j.biortech.2017.12.010
-
- 37 Takase, M., Zhang, M., Feng, W., Chen, Y., Zhao, T., Cobbina, S.J., Yang, L., (...), Wu, X.
Application of zirconia modified with KOH as heterogeneous solid base catalyst to new non-edible oil for biodiesel
(2014) *Energy Conversion and Management*, 80, pp. 117-125. Cited 115 times.
doi: 10.1016/j.enconman.2014.01.034
-
- 38 Dhawane, S.H., Bora, A.P., Kumar, T., Halder, G.
Parametric optimization of biodiesel synthesis from rubber seed oil using iron doped carbon catalyst by Taguchi approach
(2017) *Renewable Energy*, 105, pp. 616-624. Cited 91 times.
<http://www.journals.elsevier.com/renewable-and-sustainable-energy-reviews/>
doi: 10.1016/j.renene.2016.12.096
-
- 39 Salam, K.A., Velasquez-Orta, S.B., Harvey, A.P.
A sustainable integrated in situ transesterification of microalgae for biodiesel production and associated co-products – A review
(2016) *Renewable and Sustainable Energy Reviews*, 65, pp. 1179-1198. Cited 89 times.
doi: 10.1016/j.rser.2016.07.068
-
- 40 Syazwani, O.N., Teo, S.H., Islam, A., Taufiq-Yap, Y.H.
Transesterification activity and characterization of natural CaO derived from waste venus clam (*Tapes belcheri* S.) material for enhancement of biodiesel production ([Open Access](#))
(2017) *Process Safety and Environmental Protection*, 105, pp. 303-315. Cited 58 times.
http://www.elsevier.com/wps/find/journaldescription.cws_home/713889/description#description
doi: 10.1016/j.psep.2016.11.011
-

- 41 Eevera, T., Rajendran, K., Saradha, S.
Biodiesel production process optimization and characterization to assess the suitability of the product for varied environmental conditions
(2009) *Renewable Energy*, 34 (3), pp. 762-765. Cited 265 times.
doi: 10.1016/j.renene.2008.04.006
-
- 42 Mansir, N., Teo, S.H., Rashid, U., Saiman, M.I., Tan, Y.P., Alsultan, G.A., Taufiq-Yap, Y.H.
Modified waste egg shell derived bifunctional catalyst for biodiesel production from high FFA waste cooking oil. A review (Open Access)
(2018) *Renewable and Sustainable Energy Reviews*, Part 3 82, pp. 3645-3655. Cited 122 times.
doi: 10.1016/j.rser.2017.10.098
-
- 43 Korkut, I., Bayramoglu, M.
Selection of catalyst and reaction conditions for ultrasound assisted biodiesel production from canola oil
(2018) *Renewable Energy*, Part A 116, pp. 543-551. Cited 49 times.
<http://www.journals.elsevier.com/renewable-and-sustainable-energy-reviews/>
doi: 10.1016/j.renene.2017.10.010
-
- 44 Komintarachat, C., Chuepeng, S.
Solid acid catalyst for biodiesel production from waste used cooking oils
(2009) *Industrial and Engineering Chemistry Research*, 48 (20), pp. 9350-9353. Cited 71 times.
<http://pubs.acs.org/doi/pdfplus/10.1021/ie901175d>
doi: 10.1021/ie901175d
-
- 45 Shohaimi, N.A.M., Marodzi, F.N.S.
Transesterification of waste cooking oil in biodiesel production utilizing CaO/Al₂O₃ heterogeneous catalyst (Open Access)
(2018) *Malaysian Journal of Analytical Sciences*, 22 (1), pp. 157-165. Cited 11 times.
http://www.ukm.my/mjas/v22_n1/pdf/Akmar_22_1_20.pdf
doi: 10.17576/mjas-2018-2201-20
-
- 46 Van Gerpen, J.
Biodiesel processing and production
(2005) *Fuel Processing Technology*, 86 (10), pp. 1097-1107. Cited 1700 times.
doi: 10.1016/j.fuproc.2004.11.005
-

- 47 Leung, D.Y.C., Wu, X., Leung, M.K.H.
A review on biodiesel production using catalyzed transesterification
(2010) *Applied Energy*, 87 (4), pp. 1083-1095. Cited 1751 times.
<http://www.elsevier.com/inca/publications/store/4/0/5/8/9/1/index.htm>
doi: 10.1016/j.apenergy.2009.10.006
-

- 48 Reddy, A., Saleh, A., Islam, M.S., Hamdan, S.
Active Heterogeneous CaO Catalyst Synthesis from Anadara granosa (Kerang) Seashells for Jatropha Biodiesel Production
(Open Access)
(2016) *MATEC Web of Conferences*, 87, art. no. 02008. Cited 8 times.
<http://www.matec-conferences.org/>
doi: 10.1051/mateconf/20178702008
-

- 49 Agarwal, A.K., Das, L.M.
Biodiesel development and characterization for use as a fuel in compression ignition engines
(2001) *Journal of Engineering for Gas Turbines and Power*, 123 (2), pp. 440-447. Cited 534 times.
doi: 10.1115/1.1364522
-

- 50 Sakthivel, R., Ramesh, K., Purnachandran, R., Mohamed Shameer, P.
A review on the properties, performance and emission aspects of the third generation biodiesels
(2018) *Renewable and Sustainable Energy Reviews*, Part 3 82, pp. 2970-2992. Cited 189 times.
doi: 10.1016/j.rser.2017.10.037
-

- 51 Mehdi, G., Zaidi, A.A., Azeem, M.M., Abdu, S.
(2018)
"An Experimental and Comparative study about the engine Emissions of conventional Diesel Engine and Dual Fuel engine," Jun.
-

- 52 Curl, H., Donnell, K.O.
(2014)
"Chemical and Physical Properties of Refined," no. October.
-

© Copyright 2022 Elsevier B.V., All rights reserved.

About Scopus

[What is Scopus](#)

[Content coverage](#)

[Scopus blog](#)

[Scopus API](#)

[Privacy matters](#)

Language

[日本語版を表示する](#)

[查看简体中文版本](#)

[查看繁體中文版本](#)

[Просмотр версии на русском языке](#)

Customer Service

[Help](#)

[Tutorials](#)

[Contact us](#)

ELSEVIER

[Terms and conditions](#) ↗ [Privacy policy](#) ↗

Copyright © Elsevier B.V. ↗. All rights reserved. Scopus® is a registered trademark of Elsevier B.V.

We use cookies to help provide and enhance our service and tailor content. By continuing, you agree to the use of cookies ↗.

