



## DAFTAR PUSTAKA

- Abreu F.A., Lima D.G., Hamú E.H., Wolf C, Suarez P.A.Z., Utilization of metal complexes as catalysts in the transesterification of Brazilian vegetable oils with different alcohols, *Journal of Molecular Catalysis A: Chemical* 209 (2004) 29–33
- Agarwal A.K., Das L.M., Biodiesel Development and Characterization for Use as a Fuel in Compression Ignition Engines, *Journal of Engineering for Gas Turbines and Power*, 123 (2001) 440-447.
- Akbar E., Yaakob Z., Kamarudin S.K., Characteristic and Composition of Jatropha Curcas Oil Seed from Malaysia and its Potential as Biodiesel Feedstock Feedstock, *European Journal of Scientific Research*, 29 (2009) 396-403.
- Akintayo E.T., Characteristics and composition of Parkia biglobossa and Jatropha curcas oils and cakes *Bioresource Technology* 92 (2004) 307–310.
- Amin S., Review on biofuel oil and gas production processes from microalgae, *Energy Conversion and Management*, Volume 50, Issue 7, July 2009, Pages 1834–1840
- Anggraeni A., Pengaruh Jenis dan Konsentrasi Antioksidan terhadap Ketahanan Oksidasi Biodiesel dari Jarak Pagar (*Jatropha Curcas*, L.) Fakultas Teknologi Pertanian, Institut Teknologi Pertanian Bogor, 2007
- Antolovich M., Prenzler P. D., Patsalides E., McDonald S., Robards K., Methods for testing antioxidant activity, *Analyst*, 127,183–198 (2002).
- Araújo S.V., Luna F.M.T., Rola Jr E.M., Azevedo D.C.S., Cavalcante Jr C.L., A rapid method for evaluation of the oxidation stability of castor oil FAME: influence of antioxidant type and concentration, *Fuel Processing Technology* 90 (2009) 1272–1277
- Arbenz A., Averous L., Synthesis and Characterization of Innovative Materials Based on Triglycerides from Microalgae, 8th Workshop on Fats and Oils as Renewable Feedstock for the Chemical Industry March 29-31, 2015 Karlsruhe, Germany
- Atabani A.E., Silitonga A.S., Ong H.C., Mahlia T.M.I., Masjuki H.H., Badruddin I.A., Fayaz h., Non-edible vegetable oils: A critical evaluation of oil extraction, compositions, biodiesel production, characteristics, engine performance and emissions production, *Renewable and Sustainable Energy Reviews* 18 (2013) 211–245
- Azcan N., Danisman A., Alkali catalyzed transesterification of cottonseed oil by microwave irradiation, *Fuel*, 86 (2007) 2639–2644.
- Badhani B., Sharma N., Kakkar R., Gallic acid: a versatile antioxidant with promising therapeutic and industrial applications, RSC Advances, Issue 35, 2015
- Barakat A.O., Rulkötter, J., Extractable and bound fatty acids in core sediments form the Nijrdlinger Ries, southern Germany, *Fuel*, 74 (3) (1995) 416-425.
- Banchero M., Kusumaningtyas R.D., Gozzelino G., Reactive distillation in the intensification of oleic acid esterification with methanol – A simulation



case-study, Journal of Industrial and Engineering Chemistry 20 (2014) 4242–4249

- Berchmans H.J. and Hirata, S., Biodiesel production from crude Jatropha curcas L. seed oil a high content of free fatty acids, Bioresource Technology, 99 (2008) 1716-1721.
- Berrios M., Siles J., Martín M.A., Martín A., A kinetic study of the esterification of free fatty acids (FFA) in sunflower oil, Fuel, 86 (2007) 2383–2388.
- Berthiaume D., Study of the Rancimat Test Method in Measuring the Oxidation Stability of Biodiesel Ester and Blends, NRCan project, November 2006
- Beuvea R.S., Morison K.R., Enzymatic hydrolysis of canola oil with hydrodynamic cavitation, Chemical Engineering and Processing, 49 (2010) 1101–1106.
- Bondioli P., Gasparoli A., Bella L.D., Tagliabue S., Evaluation of biodiesel storage stability using reference methods, Eur. J. Lipid Sci. Technol. 104 (2002) 777–784.
- Bondioli P., Gasparoli A., Bella L.D., Toso G., Biodiesel stability under commercial storage conditions over one year, European Journal of Lipid Science and Technology, Volume 105, Issue 12, pages 735–741, December 2003
- Botella L., Bimbela F, Martín L., Arauzo J., Sánchez J.L., Oxidation stability of biodiesel fuels and blends using the Rancimat and PetroOXY methods. Effect of 4-allyl-2,6-dimethoxy phenol and catechol as biodiesel additives on oxidation stability Frontier in Chemistry, Volume 2, Article 43, 22 July 2014
- Bostyn S., Duval-Onen F., Porte C., Coic J.P., Fauduet H., Kinetic modelling of the degradation of the  $\alpha$ -tocopherol in biodiesel-rape methyl ester. Bioresource Technol. 99: 6439–6445 (2008)
- Bouaid A., Martinez M., Aracil J., Production of biodiesel from bioethanol and Brassica carinata oil: Oxidation stability study Bioresource Technology, 100 (2009) 2234–2239.
- BP Statistical Review of World Energy June 2013
- Brennan L., Owende P., Biofuels from microalgae—A review of technologies for production, processing, and extractions of biofuels and co-products Renewable and Sustainable Energy Reviews, Volume 14, Issue 2, February 2010, Pages 557–577
- Canakci M, Van Gerpen J., Biodiesel production from Oils and Fats with high Free Fatty Acids, 2001 American Society of Agricultural Engineers ISSN 0001–2351.
- Caetano C.S., Guerreiro L., Fonseca I.M., Ramos A.M., Vital J., Castanheiro J.E., Esterification of fatty acids to biodiesel over polymers with sulfonic acid groups, Applied Catalysis A: General, 359 (2009) 41–46.
- Canakci M., Monyem A., Gerpen J.V., Accelerated Oxidation Processes in Biofilter, American Society of Agricultural Engineers, 42(6) (1999) 1565-1572.



- Canakci M., Gerpen J.V., Biodiesel Production from Oils and Fats with High Free Fatty Acids, American Society of Agricultural Engineers, 44(6) (2001) 1429–1436.
- Choe E., Min D.B., Mechanisms and Factors for Edible Oil Oxidation. Comprehensive Reviews in Food Science and Food Safety, Institute of Food Technologists. 5: 169-186, 2006
- Chollacoop N., Thai Biodiesel Industry in ASEAN: Opportunities or Threats Current Biodiesel standards, Seminar-cum-Roundtable Discussion on Biofuels Standards for Lao PDR, Annual Conference 2013, Monday 1 April 2013 Thailand Science Park, Pathumthani
- Chisti Y., Research review paper Biodiesel from microalgae, Biotechnology Advances 25 (2007) 294–306
- Dias J.M., Araújo, J.M., Costa, J.F., Ferraz, M.C.M.A., Almeida, M.F., Biodiesel production from raw castor oil, Energy, 53 (2013) 58-66.
- Dinkov R., Hristov G., Stratiev D., Aldayri V.B., Effect of commercially available antioxidants over biodiesel/diesel blends stability, Fuel, 88 (2009) 732–737.
- Du Plessis L.M., De Villiers J.B.M., Va Der Walt W.H., Stability studies on methyl and ethyl fatty acid esters of sunflower seed oil, Journal of the AOCS, v.62, p.748-752, 1985.
- Eldin A.K., Makinen M., Lampi A.M., dalam Eldin A.K., Lipid Oxidation Pathways, AOCS Press, Champaign, Illinois, 2003, hal 1-36
- European Standard, Automotive fuels - Fatty acid methyl esters (FAME) for diesel, November 2008.
- Eymard S. Genot C., A modified xylene orange method to evaluate formation of lipid hydroperoxides during storage and processing of small pelagic fish, Eur. J. Lipid. Sci. Technol., 105, 497–501 (2003).
- Farooq A., Bhanger M. I., Kazi T. G., Relationship between rancimat and Active Oxygen Method Values at varying temperatures for several Oils and Fats, J. Amer. Oil Chem. Soc., 80, 151–155 (2003).
- Fattah I.M.R., Masjuki H.H., Kalam M.A., Hazrat M.A., Masum B.M., Imtenan S., Ashraful A.M. , Effect of antioxidants on oxidation stability of biodiesel derived from vegetable and animal based feedstocks, Renewable and Sustainable Energy Reviews 30 (2014) 356–370
- Focke W.W., Westhuizen I., Grobler A.B.L., Nshoane K.T., Reddy J.K., Luyt A.S., The effect of synthetic antioxidants on the oxidative stability of biodiesel Fuel 94 (2012) 227–233.
- Foidl N, Foidl G., Sanchez M., Mittebach M., Hackel S., 1996, Jatropa Curcas L., as a Source for the Production of Biofuel in Nicaragua, Bioresource Technology Vol 58, hal. 77-82
- Frankel E.N., In search of better methods to evaluate natural antioxidants and oxidative stability in food lipids, Trends in Food Science & Technology, Volume 4, Issue 7, Juli 1993, hal 220-225
- Gordon M., pada Pokorny J., Yanishlieva N., and Gordon M., eds., Antioxidants in Food: Practical Applications, Woodhead Publishing, Ltd., Cambridge, England, 2001, hal 71–84.



- Gunstone F.D., Harwood J.L., Padley F.B., The Lipid Handbook, 2nd Edition Chapman and Hall/CRC; 2 edition, July 21, 1994
- Haas M.J., Improving the economics of biodiesel production through the use of low value lipids as feedstocks: vegetable oil soapstock, Fuel Processing Technology, 86 (2005) 1087– 1096.
- Herbinet O., Pitz W.J., Westbrook C.K., Detailed chemical kinetic oxidation mechanism for a biodiesel surrogate, Combustion and Flame, 154 (2008) 507–528.
- Huang H., Chen F., Wei D., Zhang Z.W., Chen G., Biodiesel production by microalgal biotechnology, Applied Energy, 87 (2010) 38–46.
- Huerga I.R., Zanuttini M.S., Gross M.S., Querini C.A., Biodiesel production from *Jatropha curcas*: Integrated process optimization, Energy Conversion and Management, 80 (2014) 1–9.
- Ingold K.U., 1962., Metal Catalysis, Hal 93 – 121., dalam Schultz H.W., Day E. A ., Sinnhuber R.O, ed. Symposium on Foods: Lipid and Their Oxidation. The AVI Publishing Co, Inc, Wesport, Connecticut.
- International Energy Agency, Renewables Information: Beyond 2020 Documentation (2013 Edition)
- Jain S., Sharma M.P., Biodiesel production from *Jatropha curcas* oil, Renewable and Sustainable Energy Reviews, Volume 14, Issue 9, December 2010, Pages 3140–3147
- Jain S., Sharma M.P., Stability of biodiesel and its blends: A review, Renewable and Sustainable Energy Reviews 14 (2010) 667–678.
- Jain S., Sharma M.P., Oxidation stability of blends of *Jatropha* biodiesel with diesel, Fuel 90 (2011) 3014–3020..
- Kementrian Kehutanan Republik Indonesia, Statistik Kehutanan Indonesia 2011, Juli 2012.
- Khan M.A., Yusup S., Ahmad M.M., Acid esterification of a high free fatty acid crude palm oil and crude rubber seed oil blend: Optimization and parametric analysis, biomass and bioenergy, 34 (2010) 1751-176.
- Kiss A.A., Omota F., Dimian A.C., Rothenberg G., The heterogeneous advantage: biodiesel by catalytic reactive distillation, Topics in Catalysis Vol. 40, Nos. 1–4, November 2006.
- Kivevele T.T., Mbarawa M.M., Bereczky A., Laza T., Madarasz J., Impact of antioxidant additives on the oxidation stability of biodiesel produced from Croton Melegocarpus oil, Fuel Processing Technology 92 (2011) 1244–1248.
- Knothe G., Structure Indices in FA Chemistry. How Relevant Is the Iodine Value?, JAOCS, Vol. 79, no. 9 (2002)
- Knothe G., Dunn R.O., Dependence of Oil Stability Index of Fatty Compounds on Their Structure and Concentration and Presence of Metals, JAOCS, Vol. 80, no. 10 (2003)
- Knothe G., Dependence of biodiesel fuel properties on the structure of fatty acid alkyl esters, Fuel Processing Technology 86 (2005) 1059– 1070
- Knothe G., Some aspects of biodiesel oxidative stability, Fuel Processing Technology 88 (2007) 669–677.



- Lin C.C., Chiu C.C., Burning characteristics of palm-oil biodiesel under long-term storage conditions, Energy Conversion and Management, Volume 51, Issue 7, July 2010, Pages 1464–1467
- Lopez D.E., Goodwin J.G.J., Bruce D.A., Furuta S., Esterification and transesterification using modified-zirconia catalysts, Applied Catalysis A: General, 339 (2008) 76-83.
- Ma F., Hanna M.A., Biodiesel production: a review, Bioresource Technology 70 (1999) 1-15
- Marchetti J.M. Errazu, A.F., Esterification of free fatty acids using sulfuric acid as catalyst in the presence of triglycerides, Biomass and Bioenergy, 32 (2008) 892 – 895.
- McCormick R.L., Ratcliff M., Moens L., Lawrence R., Several factors affecting the stability of biodiesel in standard accelerated tests, Fuel Processing Technology 88 (2007) 651–657.
- Mata T.M., Martin A.A., Caetano N.C., Microalgae for biodiesel production and other applications: A review Renewable and Sustainable Energy Reviews 14 (2010) 217–232
- Medina M.E., Luga C., Alvarez-Idaboy J.R., Antioxidant activity of propyl gallate in aqueous and lipid media: a theoretical study, Phys Chem Chem Phys. 2013 Aug 21;15(31):13137-46
- Meira M., Santana P.M.B., Araújo A.S., Silva C.L., Filho J.R.L.L., Ferreira H.T., Oxidative degradation and corrosiveness of biodiesel, Corrosion Reviews, Volume 32, Issue 3-4 (Oct 2014)
- Motasemi F., Ani F.N., A review on microwave-assisted production of biodiesel, Renewable and Sustainable Energy Reviews, 16 (2012) 4719-4733.
- National Biodiesel Board, Biodiesel Fuel Management Best Practices for Transit November 27, 2007
- Nawar W.W., Fennema O.R., Food Chemistry, Edisi 3, Marcel and Decker, New York 1996
- Oliveira C.F., Dezaneti L.M., Garcia F.A.C., Macedo J.L., Dias J.A., Dias S.C.L., Alvim K.S.P., Esterification of Oleic acid with ethanol by 12-tungstophosphoric acid supported on zirconia, Applied Catalysis A: General, 372 (2010) 153–161.
- Ozbay N., Oktar N., Tapan, N.A., Esterification of free fatty acids in waste cooking oils (WCO): Role of ion-exchange resins, Fuel, 87 (2008) 1789–1798.
- Pandey V.C., Singh K., Singh J.S., Kumar A., Singh B., Singh R.P., *Jatropha curcas*: A potential biofuel plant for sustainable environmental developmentRenewable and Sustainable Energy Reviews Volume 16, Issue 5, June 2012, Pages 2870–2883
- Park Y.M., Lee J.Y., Chung S.H., Park I.S., Lee S.Y., Kim D.K., Lee J.S., Lee K.Y., Esterification of used vegetable oils using the heterogeneous  $\text{WO}_3/\text{ZrO}_2$  catalyst for production of biodiesel, Bioresource Technology, 101 (2010) S59–S61.
- Porter W.L., Simic M.G., Karel M., Autoxidation in Food and Biological Systems, Plenum Press, New York, 1980, hal 295



- Prado C.M.R., Filho N.R.A., Production and characterization of the biofuels obtained by thermal cracking and thermal catalytic cracking of vegetable oils, *J. Anal. Appl. Pyrolysis* 86 (2009) 338–347.
- Presa O., S., Sabater M,L., Urgell M.R, Shelf-life prediction of an infant formula using an accelerated stability test (Rancimat), *J. Agric. Food Chem.* 43:2879-2882 (1995).
- Ramos M.J., Fernández C.M., Casas A.B., Rodríguez L. , Pérez A., Influence of fatty acid composition of raw materials on biodiesel properties, *Bioresource Technology*, Volume 100, Issue 1, January 2009, Pages 261–268
- Ruiz A., Ayora-Canada M. J., Lendl B., "A rapid method for peroxide value determination in edible oils based on flow analysis with Fourier transform infrared spectroscopic detection", *Analyst*, 126, 242–246 (2001).
- Sarin R., Sharma M., Sinharay S., Malhotra R.K., Jatropha-Palm biodiesel blends: An optimum mix for Asia Fuel 86 (2007) 1365–1371.
- Sarin A., Arora R., Singh N.P., Sharma M., Malhotra R.K., Influence of metal contaminants on oxidation stability of Jatropha biodiesel , *Energy* 34 (2009) 1271–1275.
- Schwarz K., Bertelsen G., Nissen L. R., Gardner P. T., Heinonen M. I., Hopia A., T. Ba H, Lambelet P., McPhail D., Skibsted L. H., and Tijburg L., Investigation of plant extracts for the protection of processed foods against lipid oxidation. Comparison of antioxidant assays based on radical scavenging, lipid oxidation and analysis of the principal antioxidant compounds, *Eur. Food Res. Technol.*, 212, 319–328 (2001).
- Shahidi F dan Zhong Y, dalam Shahidi F., Bailey's Industrial Oil and Fat Products, Sixth Edition, A John Wiley & Sons, Inc., Publication, 2005, Chapter 8, hal 357-376
- Shuit S.H., Lee K.T., Kamaruddin A.H., Yusup S., Reactive extraction of Jatropha curcas L. seed for production of biodiesel: process optimization study. *Environ Sci Technol.* 2010 Jun 1;44(11):4361-7
- Silitonga A.S., Atabani A.E., Mahlia T.M.I., Masjuki H.H., Badruddin I.A., Mekhilefe S., A review on prospect of Jatropha curcas for biodiesel in Indonesia, *Renewable and Sustainable Energy Reviews*, 15 (2011) 3733-3756.
- Srilatha K., Lingaiah N., Devi B.L.A.P., Prasad R.B.N., Venkateswar,S., Prasad, P.S.S., Esterification of free fatty acids for biodiesel production over heteropoly tungstate supported on niobia catalysts, *Applied Catalysis A: General*, 365 (2009) 28–33.
- Stauffer C., Fats & Oils, Eagan Press, St. Paul, Minnesota, 1996, hal 15–27.
- Stempfle F., Roesle P., Heß S.K., Zimmerer J., Bartulos C.R., Lepetit B., Eckert A., Kroth P., Mecking S., Algae Oils as a Unique Source of Chemicals, 8th Workshop on Fats and Oils as Renewable Feedstock for the Chemical Industry Karlsruhe, Germany, March 29 – 31, 2015
- Stiefel S., Dassori, G., Simulation of Biodiesel Production through Transesterification of Vegetable Oils, *Ind. Eng. Chem. Res.* XXXX, xxx, 000.



- Tamunaidu P., Bhatia S., Catalytic cracking of palm oil for the production of biofuels: Optimization studies, *Bioresource Technology* 98 (2007) 3593–3601.
- Tiwari A.K., Kumar A., Raheman H., Biodiesel production from jatropha oil (*Jatropha curcas*) with high free fatty acids: An optimized process, *Biomass and Bioenergy*, 31 (2007) 569–575.
- Ulum M., Hariyanto, Statistik Kelapa Sawit Indonesia 2013, Badan Pusat Statistik Indonesia
- Van Gerpen J.A., 1996. Cetane number testing of biodiesel. Proceeding of 3rd Conference ASAE Liquid Fuel, September 15-17, Nashville, TN, USA
- Van Gerpen J., Shanks B, Pruszko R, Clements D, Knothe G., Biodiesel Analytical Methods, National Renewable Energy Laboratory 1617 Cole Boulevard, Golden, Colorado, August 2002–January 2004
- Velasco J., Dobarganes C., Oxidative stability of virgin olive oil, *Eur. J. Lipid Sci. Technol.*, 104, 661–676 (2002).
- Verduzco L.F.R., Rodríguez J.E.R., AJacob A.R.J., Predicting cetane number, kinematic viscosity, density and higher heating value of biodiesel from its fatty acid methyl ester composition, *Fuel*, Volume 91, Issue 1, January 2012, Pages 102–111
- Wanasundara, U.N., Shahidi, F., Jablonski, C.R., Comparison of standard and NMR methodologies for assessment of oxidative stability of canola and soybean oils *Food Chemistry*, Volume 52, Number 3, 1995, pp. 249–253(5)
- Wanasundara P.K.J.P.D., Shahidi F., Antioxidants: Science, Technology and Applications, dalam Shahidi F., Baileys Industrial Oil and Fat Products, 6<sup>th</sup> edition, Wiley Interscience, 2005
- Waynick Sr. Andrew., Characterization of Biodiesel Oxidation and Oxidation Product, Project No. AVFL-2b Task 1 Results SwRI® Project No. 08-10721, August 2005
- Xin J., Imahara H., Saka S., Kinetics on the oxidation of biodiesel stabilized with antioxidant, *Fuel* 88 (2009) 282–286
- Yujaroen D., Goto M., Sasaki M., Shotipruk A., Esterification of palm fatty acid distillate (PFAD) in supercritical methanol: Effect of hydrolysis on reaction reactivity, *Fuel*, 88 (2009) 2011–2016.