

DAFTAR PUSTAKA

- Abd Rashid, S. N. A., Ab. Malik, S., Embi, K., Mohd Ropi, N. A., Yaakob, H., Cheng, K. K., Sarmidi, M. R., & Leong, H. Y. (2019). Carotenoids and antioxidant activity in virgin palm oil (VPO) produced from palm mesocarp with low heat aqueous-enzyme extraction techniques. *Materials Today: Proceedings*, 42, 148–152. <https://doi.org/10.1016/j.matpr.2020.10.616>
- Abdullah, B. M., Yusop, R. M., Salimon, J., Yousif, E., & Salih, N. (2013). Physical and Chemical Properties Analysis of Jatropha curcas Seed Oil for Industrial Applications. *International Journal of Chemical, Molecular, Nuclear, Materials and Metallurgical Engineering*, 7(12), 893–896.
- Abo El-Enin, S. A., Attia, N. K., El-Ibiari, N. N., El-Diwani, G. I., & El-Khatib, K. M. (2013). In-situ transesterification of rapeseed and cost indicators for biodiesel production. *Renewable and Sustainable Energy Reviews*, 18(February), 471–477. <https://doi.org/10.1016/j.rser.2012.10.033>
- Ahmadi, K., Wulansari, A., Subroto, Y., & Estiasih, T. (2017). Protective effect of food products enriched with unsaponifiable matter from palm fatty acid distillate on the aorta of hypercholesterolemic rats. *Journal of Applied Pharmaceutical Science*, 7(12), 090–096. <https://doi.org/10.7324/JAPS.2017.71212>
- Ahn, E., Koncar, M., Mittelbach, M., & Man, R. (1995). A low-waste process for the production of biodiesel. *Separation Science and Technology*, 30(7–9), 2021–2033. <https://doi.org/10.1080/01496399508010391>
- Al-Widyan, M. I., & Al-Shyoukh, A. O. (2002). Experimental evaluation of the transesterification of waste palm oil into biodiesel. *Bioresource Technology*, 85(3), 253–256. [https://doi.org/10.1016/S0960-8524\(02\)00135-9](https://doi.org/10.1016/S0960-8524(02)00135-9)

- Amalia, I. K., Yani, M., Ariono, D., Evon, P., & Rigal, L. (2013). Biodiesel production from jatropha seeds: Solvent extraction and in situ transesterification in a single step. *Fuel*, 106, 111–117. <https://doi.org/10.1016/j.fuel.2013.01.021>
- Anguebes-Franceschi, F., Córdova-Quiroz, A., Cerón-Bretón, J., Aguilar-Ucan, C., Castillo-Martínez, G., Cerón-Bretón, R., Ruíz-Marín, A., & Montalvo-Romero, C. (2016). Optimization of Biodiesel Production from African Crude Palm Oil (*Elaeis guineensis* Jacq) with High Concentration of Free Fatty Acids by a Two-Step Transesterification Process. *Open Journal of Ecology*, 06(01), 13–21. <https://doi.org/10.4236/oje.2016.61002>
- Arora, S., Manjula, S., Gopala Krishna, A. G., & Subramanian, R. (2006). Membrane processing of crude palm oil. *Desalination*, 191(1–3), 454–466. <https://doi.org/10.1016/j.desal.2005.04.129>
- Asemi, Z., Alizadeh, S. A., Ahmad, K., Goli, M., & Esmailzadeh, A. (2016). Effects of beta-carotene fortified synbiotic food on metabolic control of patients with type 2 diabetes mellitus: A double-blind randomized cross-over controlled clinical trial. *Clinical Nutrition*, 35(4), 819–825. <https://doi.org/10.1016/j.clnu.2015.07.009>
- Atadashi, I. M., Aroua, M. K., Abdul Aziz, A. R., & Sulaiman, N. M. N. (2013). The effects of catalysts in biodiesel production: A review. *Journal of Industrial and Engineering Chemistry*, 19(1), 14–26. <https://doi.org/10.1016/j.jiec.2012.07.009>
- Atapour, M., & Kariminia, H. R. (2011). Characterization and transesterification of Iranian bitter almond oil for biodiesel production. *Applied Energy*, 88(7), 2377–2381. <https://doi.org/10.1016/j.apenergy.2011.01.014>

- Boon, C. S., McClements, D. J., Weiss, J., & Decker, E. A. (2010). Factors influencing the chemical stability of carotenoids in foods. *Critical Reviews in Food Science and Nutrition*, 50(6), 515–532. <https://doi.org/10.1080/10408390802565889>
- Brunschwig, C., Moussavou, W., & Blin, J. (2012). Use of bioethanol for biodiesel production. *Progress in Energy and Combustion Science*, 38(2), 283–301. <https://doi.org/10.1016/j.pecs.2011.11.001>
- BSN. (2006). *SNI 04-7182-2006: Biodiesel*.
- Cardenas-Toro, F. P., Forster-Carneiro, T., Rostagno, M. A., Petenate, A. J., Maugeri Filho, F., & Meireles, M. A. A. (2014). Integrated supercritical fluid extraction and subcritical water hydrolysis for the recovery of bioactive compounds from pressed palm fiber. *Journal of Supercritical Fluids*, 93, 42–48. <https://doi.org/10.1016/j.supflu.2014.02.009>
- Chattopadhyay, S., Das, S., & Sen, R. (2011). Rapid and precise estimation of biodiesel by high performance thin layer chromatography. *Applied Energy*, 88(12), 5188–5192. <https://doi.org/10.1016/j.apenergy.2011.07.027>
- Chiu, M. C., de Moraes Coutinho, C., & Gonçalves, L. A. G. (2009). Carotenoids concentration of palm oil using membrane technology. *Desalination*, 245(1–3), 783–786. <https://doi.org/10.1016/j.desal.2009.03.002>
- Choo, Y. M., Yap, S. C., Ooi, C. K., Ong, A. S. H., & Goh, S. H. (1992). Production of Palm Oil Carotenoid Concentrate and its Potential Application in Nutrition. *Lipid-Soluble Antioxidants: Biochemistry and Clinical Applications*, 243–254. https://doi.org/10.1007/978-3-0348-7432-8_20
- Chuang, M. H., & Brunner, G. (2006). Concentration of minor components in crude palm oil. *Journal of Supercritical Fluids*, 37(2), 151–156.

<https://doi.org/10.1016/j.supflu.2005.09.004>

Commission, T. I., Committee, C. I. E. C., Com-, T., & Committee, C. I. E. C. (1977). CIE Recommendations on Uniform Color Spaces, Color-Difference Equations, and Metric Color Terms. *Color Research & Application*, 2(1), 5–6. <https://doi.org/10.1002/j.1520-6378.1977.tb00102.x>

Cvengroš, J., Paligová, J., & Cvengrošová, Z. (2006). Properties of alkyl esters base on castor oil. *European Journal of Lipid Science and Technology*, 108(8), 629–635. <https://doi.org/10.1002/ejlt.200600031>

Dal Prá, V., Lunelli, F. C., Vendruscolo, R. G., Martins, R., Wagner, R., Lazzaretti, A. P., Freire, D. M. G., Alexandri, M., Koutinas, A., Mazutti, M. A., & da Rosa, M. B. (2017). Ultrasound-assisted extraction of bioactive compounds from palm pressed fiber with high antioxidant and photoprotective activities. *Ultrasonics Sonochemistry*, 36, 362–366. <https://doi.org/10.1016/j.ultsonch.2016.12.021>

Darnoko, D., & Cheryan, M. (2000a). Continuous production of palm methyl esters. *JAACS, Journal of the American Oil Chemists' Society*, 77(12), 1269–1272. <https://doi.org/10.1007/s11746-000-0199-x>

Darnoko, D., & Cheryan, M. (2000b). Kinetics of palm oil transesterification in a batch reactor. *JAACS, Journal of the American Oil Chemists' Society*, 77(12), 1263–1267. <https://doi.org/10.1007/s11746-000-0198-y>

Dewati, P. R. (2013). *Optimasi Proses dan Studi Kinetika pada Sintesa Biodiesel dari Used Cooking Oil berbasis Crude Palm Oil (CPO) dengan Reaksi Etanolisis*. Universitas Gadjah Mada.

Diwani, G. El, Attia, N. K., & Hawash, S. I. (2009). Development and evaluation of biodiesel fuel and by-products from jatropha oil. *International Journal of*

Environmental Science and Technology, 6(2), 219–224.
<https://doi.org/10.1007/bf03327625>

Encinar, J. M., González, J. F., & Rodríguez-Reinares, A. (2007). Ethanolysis of used frying oil. Biodiesel preparation and characterization. *Fuel Processing Technology*, 88(5), 513–522. <https://doi.org/10.1016/j.fuproc.2007.01.002>

Fogler, H. S. (2004). *Elements of Chemical Reaction Engineering* (3rd ed.). Prentice-Hall Inc., New Delhi.

Gerper, J. V., & Knothe, G. (2005). *The Biodiesel Handbook*. AOCS Press.
<https://doi.org/10.1016/B978-1-893997-62-2.50021-8>

Gonzalez-Diaz, A., Pataquiva-Mateus, A., & García-Núñez, J. A. (2021). Recovery of palm phytonutrients as a potential market for the by-products generated by palm oil mills and refineries—A review. *Food Bioscience*, 41(July 2020). <https://doi.org/10.1016/j.fbio.2021.100916>

Gul, K., Tak, A., Singh, A. K., Singh, P., Yousuf, B., & Wani, A. A. (2015). Chemistry, encapsulation, and health benefits of β -carotene - A review. *Cogent Food and Agriculture*, 1(1). <https://doi.org/10.1080/23311932.2015.1018696>

Gupta, M., & Kumar, N. (2012). Scope and opportunities of using glycerol as an energy source. *Renewable and Sustainable Energy Reviews*, 16(7), 4551–4556. <https://doi.org/10.1016/j.rser.2012.04.001>

Gurak, P. D., Mercadante, A. Z., González-Miret, M. L., Heredia, F. J., & Meléndez-Martínez, A. J. (2014). Changes in antioxidant capacity and colour associated with the formation of β -carotene epoxides and oxidative cleavage derivatives. *Food Chemistry*, 147, 160–169. <https://doi.org/10.1016/j.foodchem.2013.09.106>

- Haas, M. J., Scott, K. M., Marmer, W. N., & Foglia, T. A. (2004). In situ Alkaline Transesterification: An Effective Method for the Production of Fatty Acid Esters from Vegetable Oils. *JAOCs, Journal of the American Oil Chemists' Society*, 81(1), 83–89. <https://doi.org/10.1007/s11746-004-0861-3>
- Hernández-Almanza, A., Montañez-Sáenz, J., Martínez-Ávila, C., Rodríguez-Herrera, R., & Aguilar, C. N. (2014). Carotenoid production by *Rhodotorula glutinis* YB-252 in solid-state fermentation. *Food Bioscience*, 7, 31–36. <https://doi.org/10.1016/j.fbio.2014.04.001>
- Hoe, B. C., Chan, E. S., Nagasundara Ramanan, R., & Ooi, C. W. (2020). Recent development and challenges in extraction of phytonutrients from palm oil. *Comprehensive Reviews in Food Science and Food Safety*, 19(6), 4031–4061. <https://doi.org/10.1111/1541-4337.12648>
- Hoe, B. C., Chan, E. S., Ramanan, R. N., & Ooi, C. W. (2022). Direct recovery of palm carotene by liquid-liquid extraction. *Journal of Food Engineering*, 313(July 2021), 110755. <https://doi.org/10.1016/j.jfoodeng.2021.110755>
- Hori, K., Hashimoto, Y., Itani, A., Okada, T., & Tsumura, K. (2021). Effects of neutralization combined with steam distillation on the formation of monochloropropanediol esters and glycidyl esters in palm oil under laboratory-scale conditions. *Lwt*, 139(November 2020), 110783. <https://doi.org/10.1016/j.lwt.2020.110783>
- Iftikhar, Tan, H., & Zhao, Y. (2018). Enriching β -carotene from fatty acid esters mixture of palm oil using supercritical CO₂ in the silica-packed column. *Journal of CO₂ Utilization*, 26(February), 93–97. <https://doi.org/10.1016/j.jcou.2018.04.028>
- Ilham, Z., Lubes, Z., Zakaria, M., Sciences, B., Science, F., & Lumpur, K. (2009).

Analysis of Parameters for Fatty Acid Methyl Esters Production from Refined Palm Oil for Use as Biodiesel in the Single- and Two-stage Processes. 17, 5–9.

Indonesian Palm Oil Association. (2020). *Refleksi Industri Sawit 2020 & Prospek 2021 - Gabungan Pengusaha Kelapa Sawit Indonesia (GAPKI)*.
<https://gapki.id/news/18768/refleksi-industri-sawit-2020-prospek-2021>

Japir, A. A. W., Salimon, J., Derawi, D., Bahadi, M., Al-Shuja'A, S., & Yusop, M. R. (2017). Physicochemical characteristics of high free fatty acid crude palm oil. *OCL - Oilseeds and Fats, Crops and Lipids*, 24(5).
<https://doi.org/10.1051/ocl/2017033>

Jing, K., He, S., Chen, T., Lu, Y., & Ng, I. S. (2016). Enhancing beta-carotene biosynthesis and gene transcriptional regulation in *Blakeslea trispora* with sodium acetate. *Biochemical Engineering Journal*, 114, 10–17.
<https://doi.org/10.1016/j.bej.2016.06.015>

Kabbashi, N. A. (2015). Effect of Process Parameters on Yield and Conversion of *Jatropha* Biodiesel in a Batch Reactor. *Journal of Fundamentals of Renewable Energy and Applications*, 05(02). <https://doi.org/10.4172/2090-4541.1000155>

Kafuku, G., & Mbarawa, M. (2010). Biodiesel production from *Croton megalocarpus* oil and its process optimization. *Fuel*, 89(9), 2556–2560.
<https://doi.org/10.1016/j.fuel.2010.03.039>

Kaieda, M., Samukawa, T., Matsumoto, T., Ban, K., Kondo, A., Shimada, Y., Noda, H., Nomoto, F., Ohtsuka, K., Izumoto, E., & Fukuda, H. (1999). Biodiesel fuel production from plant oil catalyzed by *Rhizopus oryzae* lipase in a water-containing system without an organic solvent. *Journal of Bioscience and Bioengineering*, 88(6), 627–631. <https://doi.org/10.1016/S1389->

1723(00)87091-7

- Kaur, K., Shivhare, U. S., Basu, S., & Raghavan, G. S. V. (2012). Kinetics of Extraction of β -Carotene from Tray Dried Carrots by Using Supercritical Fluid Extraction Technique. *Food and Nutrition Sciences*, 03(05), 591–595. <https://doi.org/10.4236/fns.2012.35081>
- Khachik, F. (2006). *Process for Purification and Crystallization of Palm Oil Carotenoids* (Patent No. 7.119.238 B2).
- Knockaert, G., Lemmens, L., Van Buggenhout, S., Hendrickx, M., & Van Loey, A. (2012). Changes in β -carotene bioaccessibility and concentration during processing of carrot puree. *Food Chemistry*, 133(1), 60–67. <https://doi.org/10.1016/j.foodchem.2011.12.066>
- Knothe, G. (2006). Analyzing biodiesel: Standards and other methods. *JAOCs, Journal of the American Oil Chemists' Society*, 83(10), 823–833. <https://doi.org/10.1007/s11746-006-5033-y>
- Kumar, P. K. P., & Krishna, A. G. G. (2014). Physico-chemical characteristics and nutraceutical distribution of crude palm oil and its fractions. *Grasas y Aceites*, 65(2), 1–12.
- Kumar, R. S., & Purayil, S. T. P. (2019). Optimization of ethyl ester production from arachis hypogaea oil. *Energy Reports*, 5, 658–665. <https://doi.org/10.1016/j.egyr.2019.06.001>
- Lam, M. K., Lee, K. T., & Mohamed, A. R. (2010). Homogeneous, heterogeneous and enzymatic catalysis for transesterification of high free fatty acid oil (waste cooking oil) to biodiesel: A review. *Biotechnology Advances*, 28(4), 500–518. <https://doi.org/10.1016/j.biotechadv.2010.03.002>

- Lamria, M., Soerawingdjaja, T. H., & Sinhaan, D. (2006). Solvolytic micellization in carotene recovery from palm biodiesel. *International Oil Palm Conference, June 2006*.
- Lang, X., Dalai, A. K., Bakhshi, N. N., Reaney, M. J., & Hertz, P. B. (2001). Preparation and characterization of bio-diesels from various bio-oils. *Bioresource Technology*, 80(1), 53–62. [https://doi.org/10.1016/S0960-8524\(01\)00051-7](https://doi.org/10.1016/S0960-8524(01)00051-7)
- Latip, R. A., Baharin, B. S., Che Man, Y. B., & Rahman, R. A. (2001). Effect of adsorption and solvent extraction process on the percentage of carotene extracted from crude palm oil. *JAOCs, Journal of the American Oil Chemists' Society*, 78(1), 83–87. <https://doi.org/10.1007/s11746-001-0224-0>
- Leung, D. Y. C., Wu, X., & Leung, M. K. H. (2010). A review on biodiesel production using catalyzed transesterification. *Applied Energy*, 87(4), 1083–1095. <https://doi.org/10.1016/j.apenergy.2009.10.006>
- Lotero, E., Liu, Y., Lopez, D. E., Suwannakarn, K., Bruce, D. A., & Goodwin, J. G. (2005). Synthesis of biodiesel via acid catalysis. *Industrial and Engineering Chemistry Research*, 44(14), 5353–5363. <https://doi.org/10.1021/ie049157g>
- Ma, F., & Hanna, M. A. (1999). Biodiesel production: a review. *Bioresource Technology*, 70(1), 1–15. [https://doi.org/10.1016/S0960-8524\(99\)00025-5](https://doi.org/10.1016/S0960-8524(99)00025-5)
- Marjanović, A. V., Stamenković, O. S., Todorović, Z. B., Lazić, M. L., & Veljković, V. B. (2010). Kinetics of the base-catalyzed sunflower oil ethanolysis. *Fuel*, 89(3), 665–671. <https://doi.org/10.1016/j.fuel.2009.09.025>
- Maurer, M. M., Mein, J. R., Chaudhuri, S. K., & Constant, H. L. (2014). An improved UHPLC-UV method for separation and quantification of carotenoids in vegetable crops. *Food Chemistry*, 165, 475–482.

<https://doi.org/10.1016/j.foodchem.2014.05.038>

- Mba, O. I., Dumont, M. J., & Ngadi, M. (2017). Thermostability and degradation kinetics of tocochromanols and carotenoids in palm oil, canola oil and their blends during deep-fat frying. *LWT - Food Science and Technology*, 82, 131–138. <https://doi.org/10.1016/j.lwt.2017.04.027>
- Meher, L. C., Dharmagadda, V. S. S., & Naik, S. N. (2006). Optimization of alkali-catalyzed transesterification of Pongamia pinnata oil for production of biodiesel. *Bioresource Technology*, 97(12), 1392–1397. <https://doi.org/10.1016/j.biortech.2005.07.003>
- Meléndez-Martínez, A. J., Britton, G., Vicario, I. M., & Heredia, F. J. (2007). Relationship between the colour and the chemical structure of carotenoid pigments. *Food Chemistry*, 101(3), 1145–1150. <https://doi.org/10.1016/j.foodchem.2006.03.015>
- Mendow, G., Veizaga, N. S., & Querini, C. A. (2011). Ethyl ester production by homogeneous alkaline transesterification: Influence of the catalyst. *Bioresource Technology*, 102(11), 6385–6391. <https://doi.org/10.1016/j.biortech.2011.01.072>
- Meyers, K. J., Mares, J. A., Igo, R. P., Truitt, B., Liu, Z., Millen, A. E., Klein, M., Johnson, E. J., Engelman, C. D., Karki, C. K., Blodi, B., Gehrs, K., Tinker, L., Wallace, R., Robinson, J., LeBlanc, E. S., Sarto, G., Bernstein, P. S., SanGiovanni, J. P., & Iyengar, S. K. (2013). Genetic evidence for role of carotenoids in age-related macular degeneration in the carotenoids in age-related eye disease study (CAREDS). *Investigative Ophthalmology and Visual Science*, 55(1), 587–599. <https://doi.org/10.1167/iovs.13-13216>
- MH, N., YM, C., CH, C., & MA, H. (2018). Tocotrienols Concentration Using

- Packed Column Supercritical Fluid. *Journal of Food Processing & Technology*, 09(02), 2–5. <https://doi.org/10.4172/2157-7110.1000718>
- Mittelbach, M., & Remschmidt, C. (2004). *Biodiesel: The Comprehensive Handbook*. Boersedruck Ges.m.b.H, Vienna.
- Mokrzycki, W. S., & Tatol, M. (2012). *Colour difference ΔE - A survey.pdf*. Machine Graphic & Vision.
- Morcillo, F., Vaissayre, V., Serret, J., Avallone, S., Domonh do, H., Jacob, F., & Dussert, S. (2021). Natural diversity in the carotene, tocochromanol and fatty acid composition of crude palm oil. *Food Chemistry*, 365. <https://doi.org/10.1016/j.foodchem.2021.130638>
- Nabu, E. B. P., Sulaswatty, A., & Kartohardjono, S. (2021). Palm carotene production technologies – A membrane perspective. *IOP Conference Series: Materials Science and Engineering*, 1053(1), 012136. <https://doi.org/10.1088/1757-899x/1053/1/012136>
- NCBI. (2022). *Methanol; Methyl Alcohol*. <https://doi.org/10.5517/cc9m4qr>
- Nekkaa, A., Benaissa, A., Lalaouna, A. E. D., Mutelet, F., & Canabady-Rochelle, L. (2021). Optimization of the extraction process of bioactive compounds from *Rhamnus alaternus* leaves using Box-Behnken experimental design. *Journal of Applied Research on Medicinal and Aromatic Plants*, 25(September), 100345. <https://doi.org/10.1016/j.jarmap.2021.100345>
- Noipin, K., & Kumar, S. (2015). Optimization of ethyl ester production assisted by ultrasonic irradiation. *Ultrasonics Sonochemistry*, 22, 548–558. <https://doi.org/10.1016/j.ultsonch.2014.07.019>
- O. Egbuna, S., C. Onwubiko, D., & O. Asadu, C. (2019). Comparative Studies and

Optimization of the Process Factors for the Extraction of Beta-carotene from Palm Oil and Soybean Oil by Solvent Extraction. *Journal of Engineering Research and Reports*, 8(2), 1–16. <https://doi.org/10.9734/jerr/2019/v8i216984>

Okogeri, O., & Uchenna-Onu, U. (2016). Changes occurring in quality indices during storage of adulterated red palm oil. *International Journal of Food Science and Nutrition*, 1(3), 1–5. <http://www.foodsciencejournal.com>

Paul, E. L., Obeng, V. A. A., & Kresta, S. M. (2005). Handbook of Industrial Mixing - Science and Practice [Book Review]. In *IEEE Electrical Insulation Magazine* (Vol. 21, Issue 1). <https://doi.org/10.1109/mei.2005.1389283>

Phan, A. N., & Phan, T. M. (2008). Biodiesel production from waste cooking oils. *Fuel*, 87(17–18), 3490–3496. <https://doi.org/10.1016/j.fuel.2008.07.008>

PORIM. (1995). *Carotene content: Methods of test for palm oil and palm oil products*. Palm Oil Research Institute of Malaysia.

Pour Hosseini, S. R., Tavakoli, O., & Sarrafzadeh, M. H. (2017). Experimental optimization of SC-CO₂ extraction of carotenoids from *Dunaliella salina*. *Journal of Supercritical Fluids*, 121, 89–95. <https://doi.org/10.1016/j.supflu.2016.11.006>

Qu, T., Niu, S., Zhang, X., Han, K., & Lu, C. (2021). Preparation of calcium modified Zn-Ce/Al₂O₃ heterogeneous catalyst for biodiesel production through transesterification of palm oil with methanol optimized by response surface methodology. *Fuel*, 284(August 2020), 118986. <https://doi.org/10.1016/j.fuel.2020.118986>

Rahayu, S., & Mindaryani, A. (2009). Methanolysis of coconut oil: the kinetic of heterogeneous reaction. *Proc World Cong Eng Comput Sci*, 1(3), 3–7.

http://www.iaeng.org/publication/WCECS2009/WCECS2009_pp134-138.pdf

Rakkan, T., Suwanno, S., Paichid, N., Yunu, T., Klomklao, S., & Sangkharak, K. (2017). Optimized synthesis method for transesterification of residual oil from palm oil mill effluent and lipase from Pacific white shrimp (*Litopenaeus vannamei*) hepatopancreas to environmentally friendly biodiesel. *Fuel*, 209(July), 309–314. <https://doi.org/10.1016/j.fuel.2017.07.115>

Razi, F., Azwar, A., Sofyana, S., Erfiza, N. M., & Luxyana, M. (2022). Preparation and characterization of nanofiltration (NF) polyethersulfone and its preliminary studies on beta-carotene concentration from crude palm oil Preparation and characterization of nanofiltration (NF) polyethersulfone and its preliminary studie. *IOP Conf. Series: Earth and Environmental Science*. <https://doi.org/10.1088/1755-1315/1116/1/012064>

Ribeiro, B. D., Coelho, M. A. Z., & Barreto, D. W. (2012). Production of concentrated natural beta-carotene from buriti (*Mauritia vinifera*) oil by enzymatic hydrolysis. *Food and Bioproducts Processing*, 90(2), 141–147. <https://doi.org/10.1016/j.fbp.2011.02.003>

Ribeiro, J. A. A., Almeida, E. S., Neto, B. A. D., Abdelnur, P. V., & Monteiro, S. (2018). Identification of carotenoid isomers in crude and bleached palm oils by mass spectrometry. *LWT - Food Science and Technology*, 89(November 2017), 631–637. <https://doi.org/10.1016/j.lwt.2017.11.039>

Rodriguez-Amaya, D. B., & Kimura, M. (2004). *HarvestPlus Handbook for Carotenoid Analysis*. HarvestPlus, Washington. <https://doi.org/10.3141/2068-08>

Saifuddin, N., Saltanat, A., & Refal, H. (2014). Enhancing the Removal of Phenolic

Compounds from Palm Oil Mill Effluent by Enzymatic Pre-treatment and Microwave-Assisted Extraction. *Chemical Science Transactions*, 3(3), 1083–1093. <https://doi.org/10.7598/cst2014.797>

Sampaio, K. A., Ayala, J. V., Silva, S. M., Ceriani, R., Verhé, R., & Meirelles, A. J. A. (2013). Thermal degradation kinetics of carotenoids in palm oil. *JAACS, Journal of the American Oil Chemists' Society*, 90(2), 191–198. <https://doi.org/10.1007/s11746-012-2156-1>

Sarungallo, Z. L., Hariyadi, P., Andarwulan, N., Purnomo, E. H., & Wada, M. (2015). Analysis of α -Cryptoxanthin, β -Cryptoxanthin, α -Carotene, and β -Carotene of Pandanus Conoideus Oil by High-performance Liquid Chromatography (HPLC). *Procedia Food Science*, 3, 231–243. <https://doi.org/10.1016/j.profoo.2015.01.026>

Sato, T., Nagasawa, H., Kanezashi, M., & Tsuru, T. (2022). Transesterification membrane reactor with organosilica membrane in batch and continuous flow modes. *Chemical Engineering Journal*, 450(P1), 137862. <https://doi.org/10.1016/j.cej.2022.137862>

Shahla, S., Ngoh, G. C., & Yusoff, R. (2012). The evaluation of various kinetic models for base-catalyzed ethanolysis of palm oil. *Bioresource Technology*, 104, 1–5. <https://doi.org/10.1016/j.biortech.2011.11.010>

Smith, J. M. (1981). *Chemical Engineering Kinetics* (B. J. Clark (ed.); 2nd ed.). McGraw Hill, Singapore.

Szydlowska-Czerniak, A., Trokowski, K., Karlovits, G., & Szlyk, E. (2011). Effect of refining processes on antioxidant capacity, total contents of phenolics and carotenoids in palm oils. *Food Chemistry*, 129(3), 1187–1192. <https://doi.org/10.1016/j.foodchem.2011.05.101>

- Ulfah, M. (2017). *Recovery Karotenoid Crude Palm Oil menggunakan Karbon Aktif Mesoporous dari Cangkang Sawit*. Universitas Gadjah Mada.
- Vicente, G., Martínez, M., & Aracil, J. (2004). Integrated biodiesel production: A comparison of different homogeneous catalysts systems. *Bioresource Technology*, 92(3), 297–305. <https://doi.org/10.1016/j.biortech.2003.08.014>
- Wangi, I., Supriyanto, S., Sulisty, H., Hidayat, C., & Mada, U. G. (2023). *High Shear Reactor for Glycerolysis – Interesterification Palm Stearin-Olein Blend : Reaction Kinetics and Physical Properties*. 617224.
- Wong, Y. C., Tan, Y. P., Taufiq-Yap, Y. H., & Ramli, I. (2015). An optimization study for transesterification of palm oil using response surface methodology (RSM). *Sains Malaysiana*, 44(2), 281–290. <https://doi.org/10.17576/jsm-2015-4402-17>
- Wu, L., Guo, X., Wang, W., Medeiros, D. M., Clarke, S. L., Lucas, E. A., Smith, B. J., & Lin, D. (2016). Molecular aspects of β , β -carotene-9', 10'-oxygenase 2 in carotenoid metabolism and diseases. *Experimental Biology and Medicine*, 241(17), 1879–1887. <https://doi.org/10.1177/1535370216657900>
- Yaakob, Z., Mohammad, M., Alherbawi, M., Alam, Z., & Sopian, K. (2013). Overview of the production of biodiesel from Waste cooking oil. *Renewable and Sustainable Energy Reviews*, 18, 184–193. <https://doi.org/10.1016/j.rser.2012.10.016>
- Zhang, J., Xu, S., & Li, W. (2012). High shear mixers: A review of typical applications and studies on power draw, flow pattern, energy dissipation and transfer properties. *Chemical Engineering and Processing: Process Intensification*, 57–58, 25–41. <https://doi.org/10.1016/j.cep.2012.04.004>
- Zhang, Y., Dubé, M. A., McLean, D. D., & Kates, M. (2003). Biodiesel production

from waste cooking oil: 1. Process design and technological assessment. *Bioresource Technology*, 89(1), 1–16. [https://doi.org/10.1016/S0960-8524\(03\)00040-3](https://doi.org/10.1016/S0960-8524(03)00040-3)

Zhou, W., Konar, S. K., & Boocock, D. G. B. (2003). Ethyl esters from the single-phase base-catalyzed ethanolysis of vegetable oils. *JAOCs, Journal of the American Oil Chemists' Society*, 80(4), 367–371. <https://doi.org/10.1007/s11746-003-0705-1>