

## DAFTAR PUSTAKA

- Adam, F., Abert-Vian, M., Peltier, G., and Chemat, F., (2012), “Solvent-free” ultrasound-assisted extraction of lipids from fresh microalgae cells: A green, clean and scalable process, *Bioresource Technology*, *114*, 457–465.
- Ahmad, A. L., Yasin, N. H. M., Derek, C. J. C., and Lim, J. K., (2011), Microalgae as a sustainable energy source for biodiesel production: A review, *Renewable and Sustainable Energy Reviews*, *15*(1), 584–593.
- Angles, E., Jaouen, P., Pruvost, J., and Marchal, L., (2017), Wet lipid extraction from the microalga *Nannochloropsis* sp.: Disruption, physiological effects and solvent screening, *Algal Research*, *21*, 27–34.
- Badve, M., Gogate, P., Pandit, A., and Csoka, L., (2013), Hydrodynamic cavitation as a novel approach for wastewater treatment in wood finishing industry, *Separation and Purification Technology*, *106*, 15–21.
- Beacham, T. A., Bradley, C., White, D. A., Bond, P., and Ali, S. T., (2014), Lipid productivity and cell wall ultrastructure of six strains of *Nannochloropsis*: Implications for biofuel production and downstream processing, *Algal Research*, *6*(PA), 64–69.
- Boutesteijn, C., Drabik, D., and Venus, T. J., (2017), The interaction between EU biofuel policy and first- and second-generation biodiesel production, *Industrial Crops and Products*, *106*, 124–129.
- BPPT, (2018), *Outlook Energi Indonesia 2018* (Yudiarsono, Anindhita, A. Sugiyono, L. M. A. Wahid, & Adiarso, Eds.). Pusat Pengkajian Industri Proses dan Energi BPPT.
- Byreddy, A. R., Gupta, A., Barrow, C. J., and Puri, M., (2015), Comparison of cell disruption methods for improving lipid extraction from thraustochytrid strains, *Marine Drugs*, *13*(8), 5111–5127.
- Campbell, P. K., Beer, T., and Batten, D., (2011), Life cycle assessment of biodiesel production from microalgae in ponds., *Bioresource Technology*, *102*(1), 50–56.

- Chen, C. Y., Chen, Y. C., Huang, H. C., Ho, S. H., and Chang, J. S., (2015), Enhancing the production of eicosapentaenoic acid (EPA) from *Nannochloropsis oceanica* CY2 using innovative photobioreactors with optimal light source arrangements. *Bioresource Technology*, *191*, 407–413.
- Chen, T., Huang, B., Wang, G., and Zhao, X., (2016), Numerical study of cavitating flows in a wide range of water temperatures with special emphasis on two typical cavitation dynamics, *International Journal of Heat and Mass Transfer*, *101*, 886–900.
- Cheng, J., Huang, R., Yu, T., Li, T., Zhou, J., and Cen, K., (2014), Biodiesel production from lipids in wet microalgae with microwave irradiation and bio-crude production from algal residue through hydrothermal liquefaction, *Bioresource Technology*, *151*, 415–418.
- Cheng, J., Sun, J., Huang, Y., Feng, J., Zhou, J., and Cen, K., (2013), Dynamic microstructures and fractal characterization of cell wall disruption for microwave irradiation-assisted lipid extraction from wet microalgae, *Bioresource Technology*, *150*, 67–72.
- Chisti, Y., (2007), Biodiesel from microalgae, *Biotechnology Advances*, *25*(3), 294–306.
- Collet, P., Lardon, L., Hélias, A., Bricout, S., Lombaert-Valot, I., Perrier, B., Bernard, O., (2014), Biodiesel from microalgae—Life cycle assessment and recommendations for potential improvements, *Renewable Energy*, *71*, 525–533.
- Cui, J., Lai, H., Feng, K., and Ma, Y., (2018), Quantitative analysis of the minor deviations in nozzle internal geometry effect on the cavitating flow, *Experimental Thermal and Fluid Science*, *94*, 89–98.
- Dagostin, J. L. A., Carpiné, D., and Corazza, M. L., (2015), Extraction of soybean oil using ethanol and mixtures with alkyl esters (biodiesel) as co-solvent: Kinetics and thermodynamics, *Industrial Crops and Products*, *74*, 69–75.
- Doucha, J., and Lívanský, K., (2008), Influence of processing parameters on disintegration of *Chlorella* cells in various types of homogenizers Influence of

processing parameters on disintegration of *Chlorella* cells in various types of homogenizers, *Applied Microbiology and Biotechnology*, 81, 431–440.

Franc, J.-P., and Michel, J.-M., (2005), *Fundamentals of Cavitation*, New York: Kluwer Academic Publishers.

Gerde, J. A., Montalbo-Lombay, M., Yao, L., Grewell, D., and Wang, T., (2012), Evaluation of microalgae cell disruption by ultrasonic treatment, *Bioresource Technology*, 125, 175–181.

Gerken, H. G., Donohoe, B., and Knoshaug, E. P., (2013), Enzymatic cell wall degradation of *Chlorella vulgaris* and other microalgae for biofuels production, *Planta*, 237(1), 239–253.

Giakoumis, E. G., and Sarakatsanis, C. K., (2018), Estimation of biodiesel cetane number, density, kinematic viscosity and heating values from its fatty acid weight composition, *Fuel*, 222(March), 574–585.

Gogate, P. R., and Pandit, A. B., (2005), A review and assessment of hydrodynamic cavitation as a technology for the future, *Ultrasonics Sonochemistry*, 12(1–2 SPEC. ISS.), 21–27.

Gong, Y., and Jiang, M., (2011), Biodiesel production with microalgae as feedstock: From strains to biodiesel, *Biotechnology Letters*, 33(7), 1269–1284.

Grimi, N., Dubois, A., Marchal, L., Jubeau, S., Lebovka, N. I., and Vorobiev, E., (2014), Selective extraction from microalgae *Nannochloropsis* sp. using different methods of cell disruption, *Bioresource Technology*, 153, 254–259.

Günerken, E., D'Hondt, E., Eppink, M. H. M., Garcia-Gonzalez, L., Elst, K., and Wijffels, R. H., (2015), Cell disruption for microalgae biorefineries. *Biotechnology Advances*, 33(2), 243–260.

Halim, R., Danquah, M. K., and Webley, P. A., (2012a), Extraction of oil from microalgae for biodiesel production: A review, *Biotechnology Advances*, 30(3), 709–732.

Halim, R., Harun, R., Danquah, M. K., and Webley, P. A., (2012b), Microalgal cell

- disruption for biofuel development, *Applied Energy*, *91*(1), 116–121.
- He, Y., Peng, T., Guo, Y., Li, S., Guo, Y., Tang, L., and Chen, F., (2017), Nontoxic oil preparation from *Jatropha curcas* L. seeds by an optimized methanol/n-hexane sequential extraction method, *Industrial Crops and Products*, *97*, 308–315.
- Hidalgo, P., Ciudad, G., and Navia, R., (2016), Evaluation of different solvent mixtures in esterifiable lipids extraction from microalgae *Botryococcus braunii* for biodiesel production, *Bioresource Technology*, *201*, 360–364.
- Hielscher, (2011), Biodiesel from Algae using Ultrasonication. Retrieved February 4, 2018, from [https://www.hielscher.com/algae\\_extraction\\_01.htm](https://www.hielscher.com/algae_extraction_01.htm)
- Huang, W. C., Park, C. W., and Kim, J. D., (2017), A novel microalgal lipid extraction method using biodiesel (fatty acid methyl esters) as an extractant, *Bioresource Technology*, *226*, 94–98.
- Ibemesi, J. A., & Attah, J. C., (1990), Temperature effects on the extraction of rubber and melon seed oils, *Journal of the American Oil Chemists' Society*, *67*(7), 443–445.
- Islam, M. A., Brown, R. J., O'Hara, I., Kent, M., and Heimann, K., (2014), Effect of temperature and moisture on high pressure lipid/oil extraction from microalgae, *Energy Conversion and Management*, *88*, 307–316.
- Jorquera, O., Kiperstok, A., Sales, E. A., Embiruçu, M., and Ghirardi, M. L., (2010), Comparative energy life-cycle analyses of microalgal biomass production in open ponds and photobioreactors, *Bioresource Technology*, *101*(4), 1406–1413.
- Kawentar, W. A., and Budiman, A., (2013), Synthesis of biodiesel from second-used cooking oil, *Energy Procedia*, *32*, 190–199.
- Kelkar, M. A., Gogate, P. R., and Pandit, A. B., (2008), Intensification of esterification of acids for synthesis of biodiesel using acoustic and hydrodynamic cavitation, *Ultrasonics Sonochemistry*, *15*(3), 188–194.
- KemenESDM., (2018), *Handbook of Energy & Economic Statistic of Indonesia*.
- Kim, S. M., and Bang, I. C., (2016), Hydrodynamic cavitation characteristics of an

orifice system and its effects on CRUD-like SiC deposition, *Annals of Nuclear Energy*, 96, 12–18.

Knothe, G., and Steidley, K. R., (2005), Kinematic viscosity of biodiesel fuel components and related compounds. Influence of compound structure and comparison to petrodiesel fuel components, *Fuel*, 84(9), 1059–1065.

Kuldeep, and Saharan, V. K., (2016), Computational study of different venturi and orifice type hydrodynamic cavitating devices, *Journal of Hydrodynamics*, 28(2), 293–305.

Kumar, J., Kumar, V., Dash, A., Scholz, P., and Banerjee, R., (2017), Sustainable green solvents and techniques for lipid extraction from microalgae : A review, *ALGAL*, 21, 138–147.

Kumar, S., Singh, J., Nanoti, S. M., and Garg, M. O., (2012), A comprehensive life cycle assessment (LCA) of Jatropha biodiesel production in India, *Bioresource Technology*, 110, 723–729.

Lee, A. K., Lewis, D. M., and Ashman, P. J., (2012), Disruption of microalgal cells for the extraction of lipids for biofuels: Processes and specific energy requirements, *Biomass and Bioenergy*, 46, 89–101.

Lee, A. K., Lewis, D. M., and Ashman, P. J., (2013), Force and energy requirement for microalgal cell disruption: An atomic force microscope evaluation, *Bioresource Technology*, 128, 199–206.

Lee, A. K., Lewis, D. M., and Ashman, P. J., (2015), Microalgal cell disruption by hydrodynamic cavitation for the production of biofuels, *Journal of Applied Phycology*, 27(5), 1881–1889.

Lee, I., and Han, J. I., (2015), Simultaneous treatment (cell disruption and lipid extraction) of wet microalgae using hydrodynamic cavitation for enhancing the lipid yield, *Bioresource Technology*, 186, 246–251.

Lee, K.M., and Inaba, A., (2004), *Life Cycle Assessment Best Practices of ISO 14040 Series*, Asia-Pacific Economic Cooperation Ministry of Commerce, Industry and

Energy Republic of Korea, Committee on Trade and Investment.

- Lv, X., Zou, L., Sun, B., Wang, J., and Sun, M. Y., (2010), Variations in lipid yields and compositions of marine microalgae during cell growth and respiration, and within intracellular structures, *Journal of Experimental Marine Biology and Ecology*, 391(1–2), 73–83.
- Maity, J. P., Bundschuh, J., Chen, C. Y., and Bhattacharya, P., (2014), Microalgae for third generation biofuel production, mitigation of greenhouse gas emissions and wastewater treatment: Present and future perspectives - A mini review, *Energy*, 78, 104–113.
- Malekzadeh, M., Abedini Najafabadi, H., Hakim, M., Feilizadeh, M., Vossoughi, M., and Rashtchian, D., (2016), Experimental study and thermodynamic modeling for determining the effect of non-polar solvent (hexane)/polar solvent (methanol) ratio and moisture content on the lipid extraction efficiency from *Chlorella vulgaris*, *Bioresource Technology*, 201, 304–311.
- Martinez-Guerra, E., Gude, V. G., Mondala, A., Holmes, W., and Hernandez, R., (2014), Microwave and ultrasound enhanced extractive-transesterification of algal lipids, *Applied Energy*, 129, 354–363.
- Mata, T. M., Martins, A. A., and Caetano, N. S., (2010), Microalgae for biodiesel production and other applications: A review, *Renewable and Sustainable Energy Reviews*, 14(1), 217–232.
- Melo, M. M. R. De, Barbosa, H. M. A., Passos, C. P., and Silva, C. M., (2014), Supercritical fluid extraction of spent coffee grounds : Measurement of extraction curves, oil characterization and economic analysis. *The Journal of Supercritical Fluids*, 86, 150–159.
- Meullemiestre, A., Breil, C., Abert-Vian, M., and Chemat, F., (2016), Microwave, ultrasound, thermal treatments, and bead milling as intensification techniques for extraction of lipids from oleaginous *Yarrowia lipolytica* yeast for a biojetfuel application, *Bioresource Technology*, 211, 190–199.
- Park, C. W., Huang, W. C., Gim, S., Lee, K. S., and Kim, J. D., (2014), New type of

- extraction solvent for algal oils: Fatty acid methyl esters, *ACS Sustainable Chemistry and Engineering*, 2(12), 2653–2657.
- Passell, H., Dhaliwal, H., Reno, M., Wu, B., Ben Amotz, A., Ivry, E., and Ayer, N., (2013), Algae biodiesel life cycle assessment using current commercial data, *Journal of Environmental Management*, 129, 103–111.
- Perry, R. H., and Green, D. W., (2008), Section 10 : Transport and storage of fluids, In *Perry's Chemical Engineers' Handbook* (p. 2400).
- Piasecka, A., Krzemińska, I., and Tys, J., (2014), Physical Methods of Microalgal Biomass Pretreatment, *INTERNATIONAL Agrophysic*, 28(July), 341–348.
- Poling, B. E., Thomson, G. H., Friend, D. G., Rowley, R. L., and Wilding, W. V. (2007), Section 2: Physical and Chemical Data, In *Perry's Chemical Engineers' Handbook* (pp. 1–517).
- Postma, P. R., Miron, T. L., Olivieri, G., Barbosa, M. J., Wijffels, R. H., and Eppink, M. H. M., (2015), Mild disintegration of the green microalgae *Chlorella vulgaris* using bead milling, *Bioresource Technology*, 184, 297–304.
- Postma, P. R., Suarez-Garcia, E., Safi, C., Olivieri, G., Olivieri, G., Wijffels, R. H., and Wijffels, R. H., (2017), Energy efficient bead milling of microalgae: Effect of bead size on disintegration and release of proteins and carbohydrates, *Bioresource Technology*, 224, 670–679.
- Raghuvanshi, S., Bhakar, V., Chava, R., and Sangwan, K. S., (2018), Comparative Study Using Life Cycle Approach for the Biodiesel Production from Microalgae Grown in Wastewater and Fresh Water, *Procedia CIRP*, 69(May), 568–572.
- Safi, C., Ursu, A. V., Laroche, C., Zebib, B., Merah, O., Pontalier, P. Y., and Vaca-Garcia, C., (2014), Aqueous extraction of proteins from microalgae: Effect of different cell disruption methods, *Algal Research*, 3(1), 61–65.
- Saharan, V. K., Rizwani, M. A., Malani, A. A., and Pandit, A. B., (2013), Effect of geometry of hydrodynamically cavitating device on degradation of orange-G, *Ultrasonics Sonochemistry*, 20(1), 345–353.

- Sakulcha, N., & Srinophakun, T. (2013). *Life Cycle Assessment of Biodiesel Production from Microalgae Oil : Simulation Approach*, Kasetsart University, 84, 9–16.
- Santana, A., Jesus, S., Larrayoz, M. A., and Filho, R. M., (2012), Supercritical carbon dioxide extraction of algal lipids for the biodiesel production, *Procedia Engineering*, 42 (October 2015), 1755–1761.
- Šarc, A., Stepišnik-perdih, T., and Petkovšek, M., (2017), The issue of cavitation number value in studies of water treatment by hydrodynamic cavitation, *Ultrasonics Sonochemistry*, 34, 51–59.
- Sivaramakrishnan, K., and Ravikumar, P., (2011), Determination of Higher Heating Value of Biodiesels, *International Journal of Engineering Science and Technology*, 3(11), 7981–7987.
- Sovová, H., (2005), Mathematical model for supercritical fluid extraction of natural products and extraction curve evaluation, *Journal of Supercritical Fluids*, 33(1), 35–52.
- Suali, E., and Sarbatly, R., (2012), Conversion of microalgae to biofuel, *Renewable and Sustainable Energy Reviews*, 16(6), 4316–4342.
- Suganya, T., Varman, M., Masjuki, H. H., and Renganathan, S., (2016), Macroalgae and microalgae as a potential source for commercial applications along with biofuels production: A biorefinery approach, *Renewable and Sustainable Energy Reviews*, 55, 909–941.
- Taher, H., Al-zuhair, S., Al-marzouqi, A. H., Haik, Y., and Farid, M., (2014), Mass transfer modeling of *Scenedesmus* sp . lipids extracted by supercritical CO<sub>2</sub>, *Biomass and Bioenergy*, 70, 530–541.
- Teo, C. L., and Idris, A., (2014), Enhancing the various solvent extraction method via microwave irradiation for extraction of lipids from marine microalgae in biodiesel production, *Bioresour Technol*, 171, 477–481.
- Thomas, W.H., Tornabene, T.G., and Weissman, J., (1984), Screening for lipid

- yielding microalgae: activities for 1983, *Seri/Str-231-2207*, (April), 54.
- Topallar, H., and Geçgel, Ü., (2000), Kinetics and Thermodynamics of Oil Extraction from Sun Flower Seeds in the Presence of Aqueous Acidic, *Turkish Journal of Chemistry*, 24, 247–253.
- Turconi, R., Boldrin, A., and Astrup, T., (2013), Life cycle assessment (LCA) of electricity generation technologies: Overview, comparability and limitations, *Renewable and Sustainable Energy Reviews*, 28, 555–565.
- Yamamoto, K., King, P. M., Wu, X., Mason, T. J., and Joyce, E. M., (2015), Effect of ultrasonic frequency and power on the disruption of algal cells, *Ultrasonics Sonochemistry*, 24, 165–171.
- Yang, F., Xiang, W., Sun, X., Wu, H., Li, T., and Long, L., (2014), A novel lipid extraction method from wet microalga *Picochlorum* sp. at room temperature, *Marine Drugs*, 12(3), 1258–1270.
- Yao, L., Gerde, J. A., and Wang, T., (2012), Oil extraction from microalga *Nannochloropsis* sp. with isopropyl alcohol, *JAOCS, Journal of the American Oil Chemists' Society*, 89(12), 2279–2287.
- Yen, H., Hu, I., Chen, C., Ho, S., Lee, D., and Chang, J., (2013), Microalgae-based biorefinery – From biofuels to natural products, *Bioresource Technology*, 135, 166–174.
- Yuan, W., Hansen, A. C., and Zhang, Q., (2005), Vapor pressure and normal boiling point predictions for pure methyl esters and biodiesel fuels, *Fuel*, 84(7–8), 943–950.
- Zhang, H., Ren, X., Luo, C., Tong, Y., Larson, E. A., Lu, Z., and Gu, J., (2019), Study on transient characteristics and influencing of temperature on cavitation bubbles in various environments, *Optik - International Journal for Light and Electron Optics*. <https://doi.org/10.1016/j.ijleo.2019.01.076>