

Daftar Pustaka

- Abu-Ghosh, S., Fixler, D., Dubinsky, Z., & Iluz, D. 2016. Flashing light in microalgae biotechnology. *Bioresource Technology*. 203(4): 357-363. <https://doi.org/10.1016/j.biortech.2015.12.057>.
- Aditya, L., Vu, H. P., Johir, M., Mahlia, T., Silitonga, A., Zhang, X., Liu, Q., Tra, V., Ngo, H. H., & Nghiem, L. D. 2023. Role of culture solution pH in balancing CO₂ input and light intensity for maximizing microalgae growth rate. *Chemosphere*.343(4):140255-140265. <https://doi.org/10.1016/j.chemosphere.2023.140255>.
- Agustina, S., Aidha, N. N., & Oktarina, E. 2018. Ekstraksi Antioksidan *Spirulina* sp. Dengan Menggunakan Metode Ultrasonikasi Dan Aplikasinya Untuk Krim Kosmetik. *Jurnal Kimia Dan Kemasan*. 40(2): 105-116. <https://doi.org/10.24817/jkk.v40i2.4100>.
- Akao, P. K., Cohen-Yaniv, V., Peretz, R., Kinel-Tahan, Y., Yehoshua, Y., & Mamane, H. 2019. Effect of ozonation on *Spirulina platensis* filaments by dynamic imaging particle analysis. *Biomass and Bioenergy*. 127(5): 105247-105252. <https://doi.org/10.1016/j.biombioe.2019.05.016>.
- Al-Mamoori, S. O. H. 2020. Bioremediation by Using the Microalgae *Chlorella vulgaris* to Remove Phosphate and Nitrite from the Domestic Wastewater Treatment Plant in Iraq. *The Journal of Research on the Lepidoptera*. 51(1): 660–668. <https://doi.org/10.36872/lepi/v51i1/30106>.
- Ananthi, V., Brindhadevi, K., Pugazhendhi, A., & Arun, A. 2021. Impact of abiotic factors on biodiesel production by microalgae. *Fuel*. 284(2): 118962-118969. <https://doi.org/10.1016/j.fuel.2020.118962>.
- Anggraeni, A., Utami, E., & Mahardika, R. G. 2022. Pengaruh Salinitas terhadap Kepadatan Populasi dan Konsentrasi Klorofil-a *Spirulina* pada Media Kultur Modifikasi Walne dan Air Limbah Budidaya Ikan. *EKOTONIA: Jurnal Penelitian Biologi, Botani, Zoologi Dan Mikrobiologi*, 7(2): 112–120. <https://doi.org/10.33019/ekotonia.v7i2.3729>.
- Apel, K., & Hirt, H. 2004. REACTIVE OXYGEN SPECIES: metabolism, oxidative stress, and signal transduction. *Annual Review of Plant Biology*. 55(1):373–399. <https://doi.org/10.1146/annurev.arplant.55.031903.141701>.

- Arrosyd, M. A., Santosa, G. W., & Endrawati, H. 2024. Laju Pertumbuhan dan Kandungan Fikosianin *Spirulina* sp. pada Konsentrasi Urea yang Berbeda. *Buloma: Buletin Oseanografi Marina*. 13(1): 100–106. <https://doi.org/10.14710/buloma.v13i1.47667>.
- Ashokkumar, V., & Rengasamy, R. 2012. Mass culture of *Botryococcus braunii* Kutz. under open raceway pond for biofuel production. *Bioresource Technology*. 104 (2): 394–399. <https://doi.org/10.1016/j.biortech.2011.10.093>.
- Ayilara, M. S., Olanrewaju, O. S., Babalola, O. O., & Odeyemi, O. 2020. Waste Management through Composting: Challenges and Potentials. *Sustainability*. 12(11): 4456–4479. <https://doi.org/10.3390/su12114456>.
- Baer, S., Heining, M., Schwerna, P., Buchholz, R., & Hübner, H. 2016. Optimization of spectral light quality for growth and product formation in different microalgae using a continuous photobioreactor. *Algal Research*. 14(9): 109–115. <https://doi.org/10.1016/j.algal.2016.01.011>.
- Banerjee, S., Hew, W. E., Khatoon, H., & Shariff, M. 2011. Growth and proximate composition of tropical marine *Chaetoceros calcitrans* and *Nannochloropsis oculata* cultured outdoors and under laboratory conditions. *African Journal of Biotechnology*. 10(8): 1375–1383. <https://doi.org/10.5897/ajb10.1748>.
- Bartley, M. L., Boeing, W. J., Dungan, B., Holguín, F. O., & Schaub, T. 2013. pH effects on growth and lipid accumulation of the biofuel microalgae *Nannochloropsis salina* and invading organisms. *Journal of Applied Phycology*. 26(3): 1431–1437. <https://doi.org/10.1007/s10811-013-0177-2>.
- Belghith, T., Athmouni, K., Elloumi, J., Guerrazi, W., Stoeck, T., & Ayadi, H. 2015. Biochemical Biomarkers in the Halophilic Nanophytoplankton: *Dunaliella salina* Isolated from the Saline of Sfax (Tunisia). *Arabian Journal for Science and Engineering*. 41(1): 17–24. <https://doi.org/10.1007/s13369-015-1808-5>.
- Bibi, F., Ali, M. I., Ahmad, M., Bokhari, A., Khoo, K. S., Zafar, M., Asif, S., Mubashir, M., Han, N., & Show, P. L. 2022. Production of lipids biosynthesis from *Tetrademus nygaardii* microalgae as a feedstock for biodiesel production. *Fuel*. 326(2): 124985–124999. <https://doi.org/10.1016/j.fuel.2022.124985>.
- Blaas, H., & Kroeze, C. 2014. Possible future effects of large-scale algae cultivation for biofuels on coastal eutrophication in Europe. *Science of the Total*

- Environment*. 496(2): 45–53. <https://doi.org/10.1016/j.scitotenv.2014.06.131>.
- Bligh, E. G., & Dyer, W. J. 1959. A RAPID METHOD OF TOTAL LIPID EXTRACTION AND PURIFICATION. *Canadian Journal of Biochemistry and Physiology*. 37(8): 911–917. <https://doi.org/10.1139/o59-099>.
- Brindhadevi, K., Mathimani, T., Rene, E. R., Shanmugam, S., Lan, N. T., & Pugazhendhi, A. 2021. Impact of cultivation conditions on the biomass and lipid in microalgae with an emphasis on biodiesel. *Fuel*. 284(8): 119058-119064. <https://doi.org/10.1016/j.fuel.2020.119058>.
- Buwono, N. R., & Nurhasanah, R. Q. 2018. Studi Pertumbuhan Populasi *Spirulina* sp. pada Skala Kultur yang Berbeda. *Jurnal Ilmiah Perikanan Dan Kelautan*. 10(1): 26-34. <https://doi.org/10.20473/jipk.v10i1.8516>.
- Cardoso, L. G., Duarte, J. H., Andrade, B. B., Lemos, P. V. F., Costa, J. a. V., Druzian, J. I., & Chinalia, F. A. 2020. *Spirulina* sp. LEB 18 cultivation in outdoor pilot scale using aquaculture wastewater: High biomass, carotenoid, lipid and carbohydrate production. *Aquaculture*. 525(10): 735272-735282. <https://doi.org/10.1016/j.aquaculture.2020.735272>.
- Chen, H., & Wang, Q. 2020. Microalgae-based nitrogen bioremediation. *Algal Research*. 46, 101775-101784. <https://doi.org/10.1016/j.algal.2019.101775>
- Chen, W., Gao, L., Song, L., Sommerfeld, M. R., & Hu, Q. 2023. An improved phenol-sulfuric acid method for the quantitative measurement of total carbohydrates in algal biomass. *Algal Research*. 70(1): 102986-102994. <https://doi.org/10.1016/j.algal.2023.102986>.
- Chew, K. W., Chia, S. R., Show, P. L., Yap, Y. J., Ling, T. C., & Chang, J. 2018. Effects of water culture medium, cultivation systems and growth modes for microalgae cultivation: A review. *Journal of the Taiwan Institute of Chemical Engineers*. 91(3): 332–344. <https://doi.org/10.1016/j.jtice.2018.05.039>.
- Chin, G. J. W. L., Andrew, A. R., Abdul-Sani, E. R., Yong, W. T. L., Misson, M., & Anton, A. 2023. The effects of light intensity and nitrogen concentration to enhance lipid production in four tropical microalgae. *Biocatalysis and Agricultural Biotechnology*. 48(5): 102660-102672. <https://doi.org/10.1016/j.bcab.2023.102660>.

- Chong, J. W. R., Khoo, K. S., Yew, G. Y., Leong, W. H., Lim, J. W., Ho, Y., Ng, H. S., Munawaroh, H. S. H., & Show, P. L. 2021. Advances in production of bioplastics by microalgae using food waste hydrolysate and wastewater: A review. *Bioresource Technology*. 342(12): 125947-125961. <https://doi.org/10.1016/j.biortech.2021.125947>.
- Cy, C., & Durbin, E. 1994. Effects of pH on the growth and carbon uptake of marine phytoplankton. *Marine Ecology Progress Series*. 109(11): 83–94. <https://doi.org/10.3354/meps109083>.
- D'Alessandro, E. B., & Filho, N. R. A. 2016. Concepts and studies on lipid and pigments of microalgae: A review. *Renewable & Sustainable Energy Reviews*. 58(2): 832–841. <https://doi.org/10.1016/j.rser.2015.12.162>.
- Da Fré, N. C., Chagas, A. L. D., Rech, R., & Marcílio, N. R. 2016. Kinetic Modeling of *Dunaliella tertiolecta* Growth under Different Nitrogen Concentrations. *Chemical Engineering & Technology*. 39(9): 1716–1722. <https://doi.org/10.1002/ceat.201500585>.
- Damayanti, D. P. O., Handoyo, T., & Slameto, S. 2018. PENGARUH AMMONIUM (NH_4^+) DAN NITRAT (NO_3^-) TERHADAP PERTUMBUHAN DAN KANDUNGAN MINYAK ATSIRI TANAMAN KEMANGI (*Ocimum basilicum*) DENGAN SISTEM HIDROPONIK. *Agritop*. 16(1): 164-178. <https://doi.org/10.32528/agr.v16i1.1560>.
- Dauchet, J., Blanco, S., Cornet, J., & Fournier, R. 2015. Calculation of the radiative properties of photosynthetic microorganisms. *Journal of Quantitative Spectroscopy & Radiative Transfer*. 161(3): 60–84. <https://doi.org/10.1016/j.jqsrt.2015.03.02>.
- Debnath, C., Bandyopadhyay, T. K., Bhunia, B., Mishra, U., Narayanasamy, S., & Muthuraj, M. 2021. Microalgae: Sustainable resource of carbohydrates in third-generation biofuel production. *Renewable & Sustainable Energy Reviews*. 150(6): 111464-111485. <https://doi.org/10.1016/j.rser.2021.111464>.
- De Carvalho Silvello, M. A., Gonçalves, Í. S., Azambuja, S. P. H., Costa, S. S., Silva, P. G. P., Santos, L. O., & Goldbeck, R. 2022. Microalgae-based carbohydrates: A green innovative source of bioenergy. *Bioresource Technology*. 344(7): 126304-126318. <https://doi.org/10.1016/j.biortech.2021.126304>.

- De Morais, M. G., & Costa, J. a. V. 2007. Carbon dioxide fixation by *Chlorella kessleri*, *C. vulgaris*, *Scenedesmus obliquus* and *Spirulina* sp. cultivated in flasks and vertical tubular photobioreactors. *Biotechnology Letters*. 29(9): 1349–1352. <https://doi.org/10.1007/s10529-007-9394-6>.
- Efremenko, E., Nikol'skaya, A. B., Lyagin, I., Senko, O., Махлис, Т., Stepanov, N., Maslova, O., Mamedova, F., & Варфоломеев, С. Д. 2012. Production of biofuels from pretreated microalgae biomass by anaerobic fermentation with immobilized *Clostridium acetobutylicum* cells. *Bioresource Technology*. 114(12): 342–348. <https://doi.org/10.1016/j.biortech.2012.03.049>.
- El-Hady, A. A., Elghalid, O. A., El-Naggar, A. M., & El-Khalek, E. A. 2022. Growth performance and physiological status evaluation of *Spirulina platensis* algae supplementation in broiler chicken diet. *Livestock Science*. 263(11): 105009–105016. <https://doi.org/10.1016/j.livsci.2022.105009>.
- Elystia, S., Darsy, M. S., & Mulia, S. R. 2021. ANALISIS PENAMBAHAN BAKTERI *Azospirillum* sp. TERHADAP KEPADATAN SEL DAN KANDUNGAN LIPID MIKROALGA *Chlorella* sp. SERTA PENYISIHAN N TOTAL DI LIMBAH CAIR TAHU. *Jurnal Sains Dan Teknologi Lingkungan*. 13(2):120 - 134. <https://doi.org/10.20885/jstl.vol13.iss2.art4>.
- Esakkimuthu, S., Krishnamurthy, V., Govindarajan, R., & Swaminathan, K. 2016. Augmentation and starvation of calcium, magnesium, phosphate on lipid production of *Scenedesmus obliquus*. *Biomass and Bioenergy*. 88(9): 126–134. <https://doi.org/10.1016/j.biombioe.2016.03.019>.
- Fakhri, M., & Ekawati, A. W. 2020. PENGARUH SALINITAS TERHADAP PERTUMBUHAN, BIOMASSA DAN KLOOROFIL-a *Dunaliella* sp. *JFMR (Journal of Fisheries and Marine Research)*. 4(3): 393–398. <https://doi.org/10.21776/ub.jfmr.2020.004.03.12>.
- Faruque, M. O., Ilyas, M., Hossain, M. M., & Razzak, S. A. 2020. Influence of Nitrogen to Phosphorus Ratio and CO₂ Concentration on Lipids Accumulation of *Scenedesmus dimorphus* for Bioenergy Production and CO₂ Biofixation. *Chemistry-An Asian Journal*. 15(24): 4307–4320. <https://doi.org/10.1002/asia.202001063>.

- Farooq, W., Lee, Y. C., Ryu, B. G., Kim, B. H., Kim, H. S., Choi, Y. E., & Yang, J. W. 2013. Two-stage cultivation of two *Chlorella* sp. strains by simultaneous treatment of brewery wastewater and maximizing lipid productivity. *Bioresource Technology*. 132(12): 230–238. <https://doi.org/10.1016/j.biortech.2013.01.034>.
- Garlapati, D., Mathimani, T., Anto, S., Ahamed, T. S., Ananth, D. A., & Pugazhendhi, A. 2020. Applications of microalgal and cyanobacterial biomass on a way to safe, cleaner and a sustainable environment. *Journal of Cleaner Production*. 253(1): 119770-119791. <https://doi.org/10.1016/j.jclepro.2019.119770>.
- Go, S., Lee, S., Jeong, G., & Kim, S. 2011. Factors affecting the growth and the oil accumulation of marine microalgae, *Tetraselmis suecica*. *Bioprocess and Biosystems Engineering*. 35(12): 145–150. <https://doi.org/10.1007/s00449-011-0635-7>.
- Habib, M. a. B. 2008. review on culture, production and use of *Spirulina* as food for humans and feeds for domestic animals and fish. [http://iimsam.org/images/13570807-Spirulina-Farming-Report-FAO\[1\].pdf](http://iimsam.org/images/13570807-Spirulina-Farming-Report-FAO[1].pdf).
- Hakim, W. H. A., Erfianti, T., Dhiaurahman, A. N., Maghfiroh, K. Q., Amelia, R., Nurafifah, I., Kurnianto, D., Siswanti, D. U., Suyono, E. A., Marno, S., & Devi, I. 2023. The Effect of IAA Phytohormone (Indole-3-Acetic Acid) on the Growth, Lipid, Protein, Carbohydrate, and Pigment Content in *Euglena* sp. *Malaysian Journal of Fundamental and Applied Sciences*. 19(4): 513–524. <https://doi.org/10.11113/mjfas.v19n4.2884>.
- Handayani, T., Leksonowati, A., Riastiwi, I., Ridwan, & Witjaksono, W. 2021. Growth Response of *Moringa oleifera* Lam. Shoot Culture to Benzyladenine and Nitrogen Modification. *Jurnal Hortikultura Indonesia: Indonesian Journal of Horticulture*. 12(1): 59–68. <https://doi.org/10.29244/jhi.12.1.59-68>.
- Handoko, P., & Fajariyanti, Y. 2013. PENGARUH SPEKTRUM CAHAYA TAMPAK TERHADAP LAJU FOTOSINTESIS TANAMAN AIR *Hydrilla verticillata*. *Proceeding Biology Education Conference: Biology, Science, Enviromental, and Learning*. 10(2): 300–308. <https://jurnal.fkip.uns.ac.id/index.php/prosbio/article/download/3172/2212>.
- Hariyati, R. 2012. Pertumbuhan dan Biomassa *Spirulina* sp dalam Skala Laboratoris.

- Bioma: Berkala Ilmiah Biologi.* 10(1): 19-22.
<https://doi.org/10.14710/bioma.10.1.19-22>.
- He, S., Barati, B., Hu, X., & Wang, S. 2023. Carbon migration of microalgae from cultivation towards biofuel production by hydrothermal technology: A review. *Fuel Processing Technology.* 240(2): 107563-107580.
<https://doi.org/10.1016/j.fuproc.2022.10756>.
- Hendrawan, A. K. F., Afiati, N., & Rahman, A. 2021. Laju Nitrifikasi pada Bioremediasi Air Limbah Organik Menggunakan *Chlorella* sp. dan Bakteri Nitrifikasi-Denitrifikasi. *Jurnal Pengelolaan Sumberdaya Alam Dan Lingkungan.* 11(2): 309–323. <https://doi.org/10.29244/jpsl.11.2.309-323>.
- Ho, S., Huang, S., Chen, C., Hasunuma, T., Kondo, A., & Chang, J. S. 2013. Bioethanol production using carbohydrate-rich microalgae biomass as feedstock. *Bioresource Technology.* 135(3): 191–198.
<https://doi.org/10.1016/j.biortech.2012.10.015>.
- Ho, S., Huang, S., Chen, C., Hasunuma, T., Kondo, A., & Chang, J. 2013. Characterization and optimization of carbohydrate production from an indigenous microalga *Chlorella vulgaris* FSP-E. *Bioresource Technology.* 135(8): 157–165. <https://doi.org/10.1016/j.biortech.2012.10.100>.
- Hussein, S., El-Hamid, O. A., El-Tawil, O. S., Laz, E., & Taha, W. 2018. The Potential Protective Effect of *Spirulina platensis* against Mycotoxin Induced Oxidative Stress and Liver Damage in Rats. *Benha Veterinary Medical Journal.* 35(2): 375–383. <https://doi.org/10.21608/bvmj.2018.96432>.
- Karimi, F., Hamidian, Y., Behrouzifar, F., Mostafazadeh, R., Ghorbani-HasanSarai, A., Alizadeh, M., Mortazavi, S., Janbazi, M., & Asrami, P. N. 2022. An applicable method for extraction of whole seeds protein and its determination through Bradford's method. *Food and Chemical Toxicology.* 164(9): 113053-113060. <https://doi.org/10.1016/j.fct.2022.113053>.
- Kent, M., Welladsen, H. M., Mangott, A., & Li, Y. 2015. Nutritional evaluation of Australian microalgae as potential human health supplements. *PLOS ONE.* 10(2): 118985-118999. <https://doi.org/10.1371/journal.pone.0118985>.
- Kessly, D. S., & Brown, A. D. 1981. Salt relations of *Dunaliella*. *Transitional*

- changes in glycerol content and oxygen exchange reactions on water stress. *Archives of Microbiology*. 129(2): 154–159. <https://doi.org/10.1007/bf00455353>.
- Khoo, K. S., Ahmad, I., Chew, K. W., Iwamoto, K., Bhatnagar, A., & Show, P. L. 2023. Enhanced microalgal lipid production for biofuel using different strategies including genetic modification of microalgae: A review. *Progress in Energy and Combustion Science*. 96(11): 101071-101112. <https://doi.org/10.1016/j.pecs.2023.101071>.
- Kirst, G. O. 1990. Salinity tolerance of eukaryotic marine algae. *Annual Review of Plant Physiology and Plant Molecular Biology*. 41(1): 21–53. <https://doi.org/10.1146/annurev.pp.41.060190.000321>.
- Kim, D. G., Lee, C., Park, S. M., & Choi, Y. E. 2014. Manipulation of light wavelength at appropriate growth stage to enhance biomass productivity and fatty acid methyl ester yield using *Chlorella vulgaris*. *Bioresource Technology*. 159(1): 240–248. <https://doi.org/10.1016/j.biortech.2014.02.078>.
- Kim, J. Y., Jung, J., Jung, S., Park, Y., Tsang, Y. F., Lin, K. A., Choi, Y. J., & Kwon, E. E. 2022. Biodiesel from microalgae: Recent progress and key challenges. *Progress in Energy and Combustion Science*. 93(10): 101020-101045. <https://doi.org/10.1016/j.pecs.2022.101020>.
- Kings, A. J., Raj, R. E., Miriam, L. M., & Visvanathan, M. A. 2017. Growth studies on microalgae *Euglena sanguinea* in various natural eco-friendly composite media to optimize the lipid productivity. *Bioresource Technology*. 244(1): 1349–1357. <https://doi.org/10.1016/j.biortech.2017.06.136>.
- Koller, M., Muhr, A., & Braunegg, G. 2014. Microalgae as versatile cellular factories for valued products. *Algal Research*. 6(3): 52–63. <https://doi.org/10.1016/j.algal.2014.09.002>.
- Kumar, A., Duraisamy, R., Verma, D. K., Kumar, A., Kumar, N., Kanak, K. R., Marwein, B. M., & Kalaimohan, S. 2022. Antioxidant and phytonutrient activities of *Spirulina platensis*. *Energy Nexus*. 6(6): 100070-100079. <https://doi.org/10.1016/j.nexus.2022.100070>.
- Lakatos, G., Ranglová, K., Manoel, J. C., Grivalský, T., Kopecký, J., & Masojíděk, J. 2019. Bioethanol production from microalgae polysaccharides. *Folia Microbiologica*. 64(5): 627–644. <https://doi.org/10.1007/s12223-019-00732-0>.

- Leong, W. H., Kiatkittipong, W., Lam, M. K., Khoo, K. S., Show, P. L., Mohamad, M., Chong, S., & Abdurrahman, M. 2022. Dual nutrient heterogeneity modes in a continuous flow photobioreactor for optimum nitrogen assimilation to produce microalgal biodiesel. *Renewable Energy*. 184(2): 443–451. <https://doi.org/10.1016/j.renene.2021.11.117>.
- Liang, D., Liu, D., & Li, C. 2020. Characteristics of lipid biosynthesis of *Chlorella pyrenoidosa* under stress conditions. *Bioprocess and Biosystems Engineering*. 43(5): 877–884. <https://doi.org/10.1007/s00449-020-02284-x>.
- Lin, L., Wang, Z., Ding, Y., Li, Y., & Wen, X. 2023. Protein reserves elucidate the growth of microalgae under nitrogen deficiency. *Algal Research*. 75(7): 103269-103277. <https://doi.org/10.1016/j.algal.2023.103269>.
- Liu, H., Chen, Y., Yang, H., Hu, J., Wang, X., & Chen, H. 2022. Evolution pathway of nitrogen in hydrothermal liquefaction polygeneration of *Spirulina* as the typical high-protein microalgae. *Algal Research*. 66(14): 102759-102767. <https://doi.org/10.1016/j.algal.2022.102759>.
- Liu, H., Liu, T., Guo, H., Wang, Y., Ji, R., Kang, L., Wang, Y., Guo, X., Li, J., Jiang, L., & Fang, Z. 2024. A review of the strategy to promote microalgae value in CO₂ conversion-lipid enrichment-biodiesel production. *Journal of Cleaner Production*. 436(13): 140538-140563. <https://doi.org/10.1016/j.jclepro.2023.140538>.
- Liu, J., Song, Y., & Qiao, W. 2017. Oleaginous microalgae *Nannochloropsis* as a new model for biofuel production: Review & analysis. *Renewable & Sustainable Energy Reviews*. 72(9): 154–162. <https://doi.org/10.1016/j.rser.2016.12.120>.
- Liu, Y., Li, N., Lou, Y., Liu, Y., Zhao, X., & Wang, G. 2020. Effect of water accommodated fractions of fuel oil on fixed carbon and nitrogen by microalgae: Implication by stable isotope analysis. *Ecotoxicology and Environmental Safety*. 195(8): 110488-110497. <https://doi.org/10.1016/j.ecoenv.2020.110488>.
- Lucáková, S., Brányiková, I., & Hayes, M. 2022. Microalgal proteins and bioactives for food, feed, and other applications. *Applied Sciences*. 12(9): 4402-4427. <https://doi.org/10.3390/app12094402>.
- Ludwig, M., & Bryant, D. A. 2012. Acclimation of the Global Transcriptome of the Cyanobacterium *Synechococcus* sp. Strain PCC 7002 to Nutrient Limitations

- and Different Nitrogen Sources. *Frontiers in Microbiology*. 3(145): 1 - 15.
<https://doi.org/10.3389/fmicb.2012.00145>.
- Lund, J. W., & Fogg, G. E. 1965. Algal cultures and phytoplankton ecology. *Journal of Ecology*. 53(3): 818 - 823. <https://doi.org/10.2307/2257641>.
- Lupatini, A. L., Colla, L. M., Canan, C., & Colla, E. 2016. Potential application of microalga *Spirulina platensis* as a protein source. *Journal of the Science of Food and Agriculture*. 97(3): 724–732. <https://doi.org/10.1002/jsfa.7987>.
- Ma, S., Zeng, W., Huang, Y., Zhu, X., Xia, A., Zhu, X., & Liu, Q. 2022. Revealing the synergistic effects of cells, pigments, and light spectra on light transfer during microalgae growth: A comprehensive light attenuation model. *Bioresource Technology*. 348(4): 126777-126787.
<https://doi.org/10.1016/j.biortech.2022.126777>.
- Madkour, F. F., Kamil, A. E., & Nasr, H. S. 2012. Production and nutritive value of *Spirulina platensis* in reduced cost media. *The Egyptian Journal of Aquatic Research*. 38(1): 51–57. <https://doi.org/10.1016/j.ejar.2012.09.003>.
- Markou, T., & Nerantzis, E. T. 2013. Microalgae for high-value compounds and biofuels production: A review with focus on cultivation under stress conditions. *Biotechnology Advances*. 31(8): 1532–1542.
<https://doi.org/10.1016/j.biotechadv.2013.07.011>.
- Markou, T., Angelidaki, I., & Georgakakis, D. 2012. Microalgal carbohydrates: an overview of the factors influencing carbohydrates production, and of main bioconversion technologies for production of biofuels. *Applied Microbiology and Biotechnology*. 96(3): 631–645. <https://doi.org/10.1007/s00253-012-4398-0>.
- Martins, A. P., Necchi, O., Colepicolo, P., & Yokoya, N. S. 2011. Effects of nitrate and phosphate availabilities on growth, photosynthesis and pigment and protein contents in colour strains of *Hypnea musciformis* (Wulfen in Jacqu.) J.V. Lamour. (Gigartinales, Rhodophyta). *Revista Brasileira De Farmacognosia*. 21(2): 340–348. <https://doi.org/10.1590/s0102-695x2011005000078>.
- Michael, C., Del Ninno, M., Gross, M., & Wen, Z. 2015. Use of wavelength-selective optical light filters for enhanced microalgal growth in different algal cultivation systems. *Bioresource Technology*. 179(4): 473–482.
<https://doi.org/10.1016/j.biortech.2014.12.075>.

- Minhas, A. K., Hodgson, P., Barrow, C. J., & Adholeya, A. 2016. A review on the assessment of stress conditions for simultaneous production of microalgal lipids and carotenoids. *Frontiers in Microbiology*. 7(5): 1-19
<https://doi.org/10.3389/fmicb.2016.00546>.
- Mojzeš, P., Gao, L., Ismagulova, T. T., Pilátová, J., Moudříková, Š., Gorelova, O., Solovchenko, A., Nedbal, L., & Salih, A. 2020. Guanine, a high-capacity and rapid-turnover nitrogen reserve in microalgal cells. *Proceedings of the National Academy of Sciences of the United States of America*. 117(51): 32722–32730.
<https://doi.org/10.1073/pnas.2005460117>.
- Morales-Plasencia, M., Ibarra-Castro, L., Martínez-Brown, J. M., Nieves-Soto, M., Bermúdez-Lizárraga, J., & Rojo-Cebreros, A. 2023. The effect of nitrogen limitation on carbohydrates and β -glucan accumulation in *Nannochloropsis oculata*. *Algal Research*. 72(15): 103125-103133.
<https://doi.org/10.1016/j.algal.2023.103125>.
- Moussa, I. D., Chtourou, H., Karray, F., Sayadi, S., & Dhouib, A. 2017. Nitrogen or phosphorus repletion strategies for enhancing lipid or carotenoid production from *Tetraselmis marina*. *Bioresource Technology*. 238(105): 325–332.
<https://doi.org/10.1016/j.biortech.2017.04.008>.
- Nagappan, S., Bhosale, R. R., Nguyen, D. D., Pugazhendhi, A., Tsai, P., Chang, S. W., Ponnusamy, V. K., & Kumar, G. 2020. Nitrogen-fixing cyanobacteria as a potential resource for efficient biodiesel production. *Fuel*. 279(85): 118440-118448. <https://doi.org/10.1016/j.fuel.2020.118440>.
- Nagarajan, D., Lee, D. H., Varjani, S., Lam, S. S., Allakhverdiev, S. I., & Chang, J. 2022. Microalgae-based wastewater treatment – Microalgae-bacteria consortia, multi-omics approaches and algal stress response. *Science of the Total Environment*. 845 (32): 157110 - 157127 .
<https://doi.org/10.1016/j.scitotenv.2022.157110>.
- Otero, A., & Vincenzini, M. 2004. NOSTOC (CYANOPHYCEAE) GOES NUDE: EXTRACELLULAR POLYSACCHARIDES SERVE AS a SINK FOR REDUCING POWER UNDER UNBALANCED C/N METABOLISM. *Journal of Phycology*. 40(1): 74–81. <https://doi.org/10.1111/j.0022-3646.2003.03-067.x>.
- Park, J., Wang, H., Gargouri, M., Deshpande, R., Skepper, J. N., Holguín, F. O.,

- Juergens, M., Shachar-Hill, Y., Hicks, L. M., & Gang, D. R. 2015. The response of *Chlamydomonas reinhardtii* to nitrogen deprivation: a systems biology analysis. *The Plant Journal*. 81(4): 611–624. <https://doi.org/10.1111/tpj.12747>.
- Pramedistian, A. A. 2019. PENGARUH PERBEDAAN SALINITAS TERHADAP PERTUMBUHAN *Spirulina* sp. PADA SKALA LABORATORIUM. <https://eprints.umm.ac.id/45143/>.
- Prasadi, O. 2018. Pertumbuhan dan Biomasa *Spirulina* sp. dalam Media Pupuk sebagai Bahan Pangan Fungsional. *Jurnal Ilmiah Perikanan Dan Kelautan*. 10(2): 119–123. <https://doi.org/10.20473/jipk.v10i2.10497>.
- Prayitno, J. 2016. Pola Pertumbuhan dan Pemanenan Biomassa dalam Fotobioreaktor Mikroalga untuk Penangkapan Karbon. *Jurnal Teknologi Lingkungan*. 17(1): 45 - 53. <https://doi.org/10.29122/jtl.v17i1.1464>.
- Pruvost, J., Van Vooren, G., Gouic, B. L., Couzinet-Mossion, A., & Legrand, J. 2011. Systematic investigation of biomass and lipid productivity by microalgae in photobioreactors for biodiesel application. *Bioresource Technology*. 102(1): 150–158. <https://doi.org/10.1016/j.biortech.2010.06.153>.
- Qiu, R., Gao, S., Lopez, P. A., & Ogden, K. L. 2017. Effects of pH on cell growth, lipid production and CO₂ addition of microalgae *Chlorella sorokiniana*. *Algal Research*. 28(17): 192–199. <https://doi.org/10.1016/j.algal.2017.11.004>.
- Qu, D., & Miao, X. 2021. Carbon flow conversion induces alkali resistance and lipid accumulation under alkaline conditions based on transcriptome analysis in *Chlorella* sp. *BLD. Chemosphere*. 265 (133): 129046 - 129056. <https://doi.org/10.1016/j.chemosphere.2020.129046>.
- Ramanna, L., Rawat, I., & Bux, F. 2017. Light enhancement strategies improve microalgal biomass productivity. *Renewable & Sustainable Energy Reviews*. 80(28): 765–773. <https://doi.org/10.1016/j.rser.2017.05.202>.
- Ran, W., Wang, H., Liu, Y., Qi, M., Qi, X., Yao, C., Zhang, Y., & Lan, X. 2019. Storage of starch and lipids in microalgae: Biosynthesis and manipulation by nutrients. *Bioresource Technology*. 291 (55): 121894-121908. <https://doi.org/10.1016/j.biortech.2019.121894>.
- Rangkuti, PM dan Suyono, EA. 2021. Pengaruh Salinitas Terhadap Kontaminasi, Pertumbuhan, dan Kandungan Metabolit Kultur Massal *Spirulina* (*Arthrospira*

platensis Gomont). *Thesis*. Universitas Gadjah Mada.

- Richter, P., Liu, Y., An, Y., Li, X., Nasir, A., Strauch, S. M., Becker, I., Krüger, J., Schuster, M., Ntefidou, M., Daiker, V., Haag, F. W. M., Aiach, A., & Lebert, M. 2015. Amino acids as possible alternative nitrogen source for growth of *Euglena gracilis* Z in life support systems. *Life Sciences in Space Research*. 4(1): 1–5. <https://doi.org/10.1016/j.lssr.2014.11.001>.
- Rinanti, A., & Purwadi, R. 2019. Increasing carbohydrate and lipid productivity in tropical microalgae biomass as a sustainable biofuel feed stock. *Energy Procedia*. 158(132): 1215–1222. <https://doi.org/10.1016/j.egypro.2019.01.310>.
- Rinawati, M., Sari, L. A., & Pursetyo, K. T. 2020. Chlorophyll and carotenoids analysis spectrophotometer using method on microalgae. *IOP Conference Series: Earth and Environmental Science*. 441(1), 12056 - 12077. <https://doi.org/10.1088/1755-1315/441/1/012056>.
- Rosenberg, J. N., Mathias, A., Korth, K., Betenbaugh, M. J., & Oyler, G. A. 2011. Microalgal biomass production and carbon dioxide sequestration from an integrated ethanol biorefinery in Iowa: A technical appraisal and economic feasibility evaluation. *Biomass and Bioenergy*. 35(9): 3865–3876. <https://doi.org/10.1016/j.biombioe.2011.05.014>.
- Roy, S. S., & Pal, R. 2014. Microalgae in Aquaculture: A Review with Special References to Nutritional Value and Fish Dietetics. *Proceedings of the Zoological Society*. 68(1): 1–8. <https://doi.org/10.1007/s12595-013-0089-9>.
- Sagita, L., Liman, L., Fathul, F., & Muhtarudin, M. 2022. PENGARUH PEMBERIAN JENIS DAN DOSIS PUPUK NITROGEN (UREA DAN CALCIUM AMMONIUM NITRATE) TERHADAP PRODUKTIVITAS RUMPUT GAMA UMAMI. *Jurnal Riset Dan Inovasi Peternakan*. 6(4): 374–384. <https://doi.org/10.23960/jrip.2022.6.4.374-384>.
- Sathasivam, R., Radhakrishnan, R., Hashem, A., & Abd_Allah, E. F. 2019. Microalgae metabolites: A rich source for food and medicine. *Saudi Journal of Biological Sciences*. 26(4): 709–722. <https://doi.org/10.1016/j.sjbs.2017.11.003>.
- Schuhmann, H., Lim, D. K. Y., & Schenk, P. M. 2012. Perspectives on metabolic engineering for increased lipid contents in microalgae. *Biofuels*. 3(1): 71–86.

<https://doi.org/10.4155/bfs.11.147>.

- Schwenzfeier, A., Wierenga, P. A., & Gruppen, H. 2011. Isolation and characterization of soluble protein from the green microalgae *Tetraselmis* sp. *Bioresource Technology*. 102(19): 9121–9127. <https://doi.org/10.1016/j.biortech.2011.07.046>.
- Shah, S. a. R., Raja, I. A., Rizwan, M., Rashid, N., Mahmood, Q., Shah, F., & Pervez, A. 2018. Potential of microalgal biodiesel production and its sustainability perspectives in Pakistan. *Renewable & Sustainable Energy Reviews*. 81(66): 76–92. <https://doi.org/10.1016/j.rser.2017.07.044>.
- Shanthi, G., Premalatha, M., & Anantharaman, N. 2021. Potential utilization of fish waste for the sustainable production of microalgae rich in renewable protein and phycocyanin-*Arthrospira platensis*/Spirulina. *Journal of Cleaner Production*. 294 (185): 126106 - 126117. <https://doi.org/10.1016/j.jclepro.2021.126106>.
- Sharma, R., Garg, P., Kumar, P., Bhatia, S. K., & Kulshrestha, S. 2020. Microbial fermentation and its role in quality improvement of fermented foods. *Fermentation*. 6(4): 106 - 126 . <https://doi.org/10.3390/fermentation6040106>.
- Sathya, R., MubarakAli, D., MohamedSaalis, J., & Kim, J. 2021. A Systemic Review on Microalgal Peptides: Bioprocess and Sustainable Applications. *Sustainability*. 13(6): 3262 - 3277 . <https://doi.org/10.3390/su13063262>.
- Shen, Y., Qiu, S., Chen, Z., Zhang, Y., Trent, J. D., & Ge, S. 2020. Free ammonia is the primary stress factor rather than total ammonium to *Chlorella sorokiniana* in simulated sludge fermentation liquor. *Chemical Engineering Journal*. 397 (214): 125490 - 125502. <https://doi.org/10.1016/j.cej.2020.125490>.
- Song, X., Liu, B., Kong, F., Ren, N., & Ren, H. 2022. Overview on stress-induced strategies for enhanced microalgae lipid production: Application, mechanisms and challenges. *Resources, Conservation and Recycling*. 183(3): 106355 - 106369. <https://doi.org/10.1016/j.resconrec.2022.106355>.
- Soni, R. A., Sudhakar, K., & Rana, R. 2017. Spirulina – From growth to nutritional product: A review. *Trends in Food Science and Technology*. 69(3): 157–171. <https://doi.org/10.1016/j.tifs.2017.09.010>.
- Srinivasan, R., Mageswari, A., Subramanian, P., Suganthi, C., Chaitanyakumar, A., Aswini, V., & Gothandam, K. M. 2018. Bicarbonate supplementation enhances

- growth and biochemical composition of *Dunaliella salina* V-101 by reducing oxidative stress induced during macronutrient deficit conditions. *Scientific Reports*. 8(1): 6972 - 6986 . <https://doi.org/10.1038/s41598-018-25417-5>.
- Sun, Z., Sun, L., & Liu, Y. 2022. The potential impact of replacing nitrate with ammonium hydroxide in microalgae production on the biomass productivity and CO₂ utilization efficiency. *Algal Research*. 67(9): 102870 - 102880. <https://doi.org/10.1016/j.algal.2022.102870>.
- Syaichurrozi, I., Toron, Y. S., Dwicahyanto, S., & Wardalia, W. 2023. Pengaruh Perbedaan Jenis dan Konsentrasi Sumber Nitrogen (NaNO₃ dan urea) terhadap Produksi Biomasa *Spirulina platensis*. *Eksergi*. 20(2): 112 - 117. <https://doi.org/10.31315/e.v20i2.9367>.
- Syaichurrozi, I., Wardalia, W., Dwicahyanto, S., & Toron, Y. S. 2022. Pengaruh Variasi Konsentrasi NaNO₃ pada Medium Raoof terhadap Kultivasi *Spirulina platensis*. *Eksergi*. 19(1): 15 - 20 . <https://doi.org/10.31315/e.v19i1.6581>.
- Tan, J. S., Lee, S. Y., Chew, K. W., Lam, M. K., Ho, S., & Show, P. L. 2020. A review on microalgae cultivation and harvesting, and their biomass extraction processing using ionic liquids. *Bioengineered*. 11(1): 116–129. <https://doi.org/10.1080/21655979.2020.1711626>.
- Tewal, F., Kemer, K., Rimper, J., Mantiri, D. M. H., Pelle, W. E., & Mudeng, J. D. 2021. LAJU PERTUMBUHAN DAN KEPADATAN MIKROALGA *Dunaliella* sp. PADA PEMBERIAN TIMBAL ASETAT DENGAN KONSENTRASI YANG BERBEDA. *Jurnal Pesisir Dan Laut Tropis (Tropical Coastal and Marine Research)*. 9(1): 30 - 35. <https://doi.org/10.35800/jpltr.9.1.2021.33571>.
- Tri-Panji, & Suharyanto, S. 2016. Optimization media from low-cost nutrient sources for growing *Spirulina platensis* and carotenoid production Optimasi media dengan sumber nutrisi murah untuk pertumbuhan dan produksi karotenoid *Spirulina platensis*. *Menara Perkebunan: Jurnal Penelitian Bioteknologi Perkebunan*, 69(1): 23 - 44 . <https://doi.org/10.22302/iribb.jur.mp.v69i1.175>
- Van De Walle, S., Broucke, K., Baune, M., Terjung, N., Van Royen, G., & Boukid, F. 2023. Microalgae protein digestibility: How to crack open the black box. *Critical Reviews in Food Science and Nutrition*, 23(11): 1–23.

<https://doi.org/10.1080/10408398.2023.2181754>.

- Van Lal Chhandama, M., Satyan, K. B., Changmai, B., Vanlalveni, C., & Rokhum, S. L. 2021. Microalgae as a feedstock for the production of biodiesel: A review. *Bioresource Technology Reports*. 15 (1): 100771 - 100784. <https://doi.org/10.1016/j.biteb.2021.100771>.
- Wardani, N. K., Supriyantini, E., & Santosa, G. W. 2022. Pengaruh Konsentrasi Pupuk Walne Terhadap Laju Pertumbuhan dan Kandungan Klorofil-a *Tetraselmis chuii*. *Journal of Marine Research*. 11(1): 77–85. <https://doi.org/10.14710/jmr.v11i1.31732>.
- Warmling, B. R., Chiarello, L. M., Botton, V., Gonçalves, M. J., Costa, J. a. V., & De Carvalho, L. F. 2022. Bioaromas from microalgae *Spirulina* sp. by ethylic esterification reactions. *Biochemical Engineering Journal*. 186(71): 108542 - 108549. <https://doi.org/10.1016/j.bej.2022.108542>.
- Wase, N., Black, P. N., Stanley, B. A., & DiRusso, C. C. 2014. Integrated Quantitative Analysis of Nitrogen Stress Response in *Chlamydomonas reinhardtii* Using Metabolite and Protein Profiling. *Journal of Proteome Research*. 13(3): 1373–1396. <https://doi.org/10.1021/pr400952z>.
- Wijihastuti, R. S., Lutfiah, A., & Noriko, N. 2020. Pengaruh Pertumbuhan *Spirulina* sp. terhadap Penggunaan Pupuk Organik Cair sebagai Media Tumbuh. *Jurnal Al-Azhar Indonesia: Seri Sains Dan Teknologi (E-journal)*. 5(4): 202 - 208 . <https://doi.org/10.36722/sst.v5i4.445>.
- Wijffels, R. H., Barbosa, M. J., & Eppink, M. 2010. Microalgae for the production of bulk chemicals and biofuels. *Biofuels, Bioproducts and Biorefining*. 4(3): 287–295. <https://doi.org/10.1002/bbb.215>.
- Williamson, E., Ross, I. L., Wall, B. T., & Hankamer, B. 2023. Microalgae: potential novel protein for sustainable human nutrition. 29(3): 370 - 382 *Trends in Plant Science*. <https://doi.org/10.1016/j.tplants.2023.08.006>.
- Xing, C., Li, J., Lam, S. M., Yuan, H., Shui, G., & Yang, J. 2021. The role of glutathione-mediated triacylglycerol synthesis in the response to ultra-high cadmium stress in *Auxenochlorella protothecoides*. *Journal of Environmental Sciences*. 108 (73): 58–69. <https://doi.org/10.1016/j.jes.2021.02.018>.
- Wen, X., Du, K., Wang, Z., Peng, X., Luo, L., Tao, H., Xu, Y., Zhang, D., Geng, Y.,

- & Li, Y. 2016. Effective cultivation of microalgae for biofuel production: a pilot-scale evaluation of a novel oleaginous microalga *Graesiella* sp. WBG-1. *Biotechnology for Biofuels*. 9(1): 123 - 137 <https://doi.org/10.1186/s13068-016-0541-y>.
- Yuniarti, A., Damayani, M., & Nur, D. M. 2019. EFEK PUPUK ORGANIK DAN PUPUK N,P,K TERHADAP C-Organik, N-Total, C/N, SERAPAN N, SERTA HASIL PADI HITAM (*Oryza sativa* L. indica) PADA INCEPTISOLS. *Jurnal Pertanian Presisi (Journal of Precision Agriculture)*. 3(2): 90–105. <https://doi.org/10.35760/jpp.2019.v3i2.2205>.
- Zerveas, S., Mente, M. S., Tsakiri, D., & Kotzabasis, K. 2021. Microalgal photosynthesis induces alkalization of aquatic environment as a result of H⁺ uptake independently from CO₂ concentration New perspectives for environmental applications. *Journal of Environmental Management*. 289(110): 112546 - 112556. <https://doi.org/10.1016/j.jenvman.2021.112546>.