

## DAFTAR PUSTAKA

- Abdel-Aal, E. I., & Mofeed, J. (2020). Mass production of arthrospira platensis on the livestock manure for use as a protein source in animal feed. *Egyptian Journal of Aquatic Biology and Fisheries*, 24(7-Special issue), 725–739. <https://doi.org/10.21608/EJABF.2020.127643>
- Abou-shanab, R. A. I., Hwang, J., Cho, Y., Min, B., & Jeon, B. (2011). Characterization of microalgal species isolated from fresh water bodies as a potential source for biodiesel production. *Applied Energy*, 88(10), 3300–3306. <https://doi.org/10.1016/j.apenergy.2011.01.060>
- Adhikari-Devkota, A., Elbashir, S. M. I., Watanabe, T., & Devkota, H. P. (2019). Chemical constituents from the flowers of Satsuma mandarin and their free radical scavenging and  $\alpha$ -glucosidase inhibitory activities. *Natural Product Research*, 33(11), 1670–1673. <https://doi.org/10.1080/14786419.2018.1425856>
- Ahmed, F. E., Ahmed, F. E., Ahmed, F. E., Gouda, M. M., Gouda, M. M., Ahmed, N. C., Ahmed, N. C., & Hussein, L. (2019). Quantification of Micrornas by Absolute Dpcr for the Diagnostic Screening of Colon Cancer. *Journal Of Colon And Rectal Cancer*, 1(3), 10–37. <https://doi.org/10.14302/issn.2471-7061.jcrc-18-2526>
- Alam, M. M., Mumtaz, A. S., Russell, M., Grogger, M., Veverka, D., & Hallenbeck, P. C. (2019). Isolation and characterization of microalgae from diverse Pakistani habitats: Exploring third-generation biofuel potential. *Energies*, 12(14), 1–17. <https://doi.org/10.3390/en12142660>
- Ali, H. E. A., Shanab, S. M. M., Abo-State, M. A. M., Shalaby, E. A. A., El Demerdash, U. M. N., & Abdullah, M. A. (2014). Screening of microalgae for antioxidant activities, carotenoids and phenolic contents. *Applied Mechanics and Materials*, 625(September), 156–159. <https://doi.org/10.4028/www.scientific.net/AMM.625.156>
- Ali, O. (2013). Genetics of type 2 diabetes. *Current Science*, 4(4), 114–123. [https://doi.org/10.5005/jp/books/12626\\_22](https://doi.org/10.5005/jp/books/12626_22)
- Almendinger, M., Saalfrank, F., Rohn, S., Kurth, E., Springer, M., & Pleissner, D. (2021). Characterization of selected microalgae and cyanobacteria as sources of compounds with antioxidant capacity. *Algal Research*, 53(October 2020), 102168. <https://doi.org/10.1016/j.algal.2020.102168>
- Amri, E., Dharma, A., & Tjong, D. H. (2017). *Screening Anti-Acne Potency of Microalgae : Antibacterial and Antioxidant Activities CODEN ( USA ): PCHHAX Screening Anti-Acne Potency of Microalgae : Antibacterial and Antioxidant*

*Activities. April.*

- Arundita, S., Kurniawan, F., Ismed, F., Rita, R. S., & Putra, D. P. (2020). In vitro alpha glucosidase activity of uncaria gambir roxb. And syzygium polyanthum (wight) walp. From West Sumatra, Indonesia. *Open Access Macedonian Journal of Medical Sciences*, 8(A), 810–817. <https://doi.org/10.3889/oamjms.2020.4298>
- Atlas, I. D. F. D. (2019). International Diabetes Federation. In *The Lancet* (Vol. 266, Issue 6881). [https://doi.org/10.1016/S0140-6736\(55\)92135-8](https://doi.org/10.1016/S0140-6736(55)92135-8)
- Babich, O., Dolganyuk, V., Andreeva, A., Katserov, D., Matskova, L., Ulrikh, E., Ivanova, S., Michaud, P., & Sukhikh, S. (2022). *Isolation of Valuable Biological Substances from Microalgae Culture*.
- Bansal, A. K., & Bilaspuri, G. S. (2011). Impacts of oxidative stress and antioxidants on semen functions. *Veterinary Medicine International*, 2011. <https://doi.org/10.4061/2011/686137>
- Bao, B., Thomas-Hall, S. R., & Schenk, P. M. (2022). Fast-Tracking Isolation, Identification and Characterization of New Microalgae for Nutraceutical and Feed Applications. *Phycology*, 2(1), 86–107. <https://doi.org/10.3390/phycology2010006>
- Becker, E. W. (2007). Micro-algae as a source of protein. *Biotechnology Advances*, 25(2), 207–210. <https://doi.org/10.1016/j.biotechadv.2006.11.002>
- Bennici, G., Almahasheer, H., & Alghrably, M. (2024). *species (ROS) and protein aggregation through pharmacological interventions.* 17448–17460. <https://doi.org/10.1039/d4ra02349h>
- Bulut, O., Ak, D., Yücel, M., & Öktem, H. A. (2019). *Phenolic compounds , carotenoids , and antioxidant capacities of a thermo-tolerant Scenedesmus sp . ( Chlorophyta ) extracted with different solvents. I.*
- Cavonius, L. R., Carlsson, N. G., & Undeland, I. (2014). Quantification of total fatty acids in microalgae: Comparison of extraction and transesterification methods. *Analytical and Bioanalytical Chemistry*, 406(28), 7313–7322. <https://doi.org/10.1007/s00216-014-8155-3>
- Chaidir, Z., Putri, M., & June, M. (2017). Research Journal of Pharmaceutical , Biological and Chemical Sciences Isolation and Identification of Microalgae from Harau Valley Payakumbuh , West Sumatra as One Agent Producing Compounds Antibacterial . *Research Journal of Pharmaceutical, Biological and Chemical Sciences Isolation*, 8(1950), 1950–1957.
- Chaidir, Z., Syaputra, A., Mardiah, E., & Pardi, H. (2021). The influence of palm oil mill effluent (Pome) pre-treatment as scenedesmus dimorphus microalgae cultivation medium for biodiesel. *AACL Bioflux*, 14(4), 2487–2492.

- Chiellini, C., Serra, V., Gammuto, L., Ciurli, A., Longo, V., & Gabriele, M. (2022). Evaluation of Nutraceutical Properties of Eleven Microalgal Strains Isolated from Different Freshwater Aquatic Environments: Perspectives for Their Application as Nutraceuticals. *Foods*, 11(5). <https://doi.org/10.3390/foods11050654>
- Choo, W. T., Teoh, M. L., Phang, S. M., Convey, P., Yap, W. H., Goh, B. H., & Beardall, J. (2020). Microalgae as Potential Anti-Inflammatory Natural Product Against Human Inflammatory Skin Diseases. *Frontiers in Pharmacology*, 11(July), 1–11. <https://doi.org/10.3389/fphar.2020.01086>
- Coulombier, N., Jauffrais, T., & Lebouvier, N. (2021). Antioxidant compounds from microalgae: A review. *Marine Drugs*, 19(10). <https://doi.org/10.3390/MD19100549>
- D’Oria, R., Laviola, L., Giorgino, F., Unfer, V., Bettocchi, S., & Scioscia, M. (2017). PKB/Akt and MAPK/ERK phosphorylation is highly induced by inositol: Novel potential insights in endothelial dysfunction in preeclampsia. *Pregnancy Hypertension*, 10(November), 107–112. <https://doi.org/10.1016/j.preghy.2017.07.001>
- de Carvalho Silvello, M. A., Severo Gonçalves, I., Patrícia Held Azambuja, S., Silva Costa, S., Garcia Pereira Silva, P., Oliveira Santos, L., & Goldbeck, R. (2022). Microalgae-based carbohydrates: A green innovative source of bioenergy. *Bioresource Technology*, 344(November 2021). <https://doi.org/10.1016/j.biortech.2021.126304>
- de Vera, C. R., Crespín, G. D., Daranas, A. H., Looga, S. M., Lillsunde, K. E., Tammela, P., Perälä, M., Hongisto, V., Virtanen, J., Rischer, H., Muller, C. D., Norte, M., Fernández, J. J., & Souto, M. L. (2018). Marine Microalgae: Promising source for new bioactive compounds. *Marine Drugs*, 16(9), 1–12. <https://doi.org/10.3390/MD16090317>
- Dębowksi, M., Zieliński, M., Kazimierowicz, J., Kujawska, N., & Talbierz, S. (2020). Microalgae cultivation technologies as an opportunity for bioenergetic system development—advantages and limitations. *Sustainability (Switzerland)*, 12(23), 1–37. <https://doi.org/10.3390/su12239980>
- Deshmukh, S., Bala, K., & Kumar, R. (2019). Selection of microalgae species based on their lipid content , fatty acid profile and apparent fuel properties for biodiesel production.
- Devkota, H. P., Kurizaki, A., Tsushiro, K., Adhikari-Devkota, A., Hori, K., Wada, M., & Watanabe, T. (2021). Flavonoids from the leaves and twigs of Lindera sericea (Seibold et Zucc.) Blume var. sericea (Lauraceae) from Japan and their bioactivities. *Functional Foods in Health and Disease*, 11(1), 34. <https://doi.org/10.31989/ffhd.v1i1.769>

- Dowarah, J., & Singh, V. P. (2020). Anti-diabetic drugs recent approaches and advancements. *Bioorganic and Medicinal Chemistry*, 28(5), 115263. <https://doi.org/10.1016/j.bmc.2019.115263>
- Duong, V. T., Li, Y., Nowak, E., & Schenk, P. M. (2012). Microalgae isolation and selection for prospective biodiesel production. *Energies*, 5(6), 1835–1849. <https://doi.org/10.3390/en5061835>
- El-Chaghaby, G. A., Rashad, S., Abdel-Kader, S. F., Rawash, E. S. A., & Moneem, M. A. (2019). Assessment of phytochemical components, proximate composition and antioxidant properties of *scenedesmus obliquus*, *chlorella vulgaris* and *spirulina platensis* algae extracts. *Egyptian Journal of Aquatic Biology and Fisheries*, 23(4), 521–526. <https://doi.org/10.21608/ejabf.2019.57884>
- Elshobary, M. E., El-Shenody, R. A., Ashour, M., Zabed, H. M., & Qi, X. (2020). Antimicrobial and antioxidant characterization of bioactive components from *Chlorococcum minutum*. *Food Bioscience*, 35(301), 100567. <https://doi.org/10.1016/j.fbio.2020.100567>
- Eswaran, K., & Vennison, J. (2014). *PHYTOCHEMICALS, ANTIMICROBIAL AND ANTIOXIDANT SCREENING FROM FIVE DIFFERENT MARINE MICROALGAE Colorimetric biosensor using nanomaterials View project In vivo cloning of cellulase View project Karpanai Selvan*. 2, 78–85. [www.jchps.com](http://www.jchps.com)
- Fan, J., Fu, A., & Zhang, L. (2019). Progress in molecular docking. *Quantitative Biology*, 7(2), 83–89. <https://doi.org/10.1007/s40484-019-0172-y>
- Fauziah, S. M., & Laily, A. N. (2015). *Identifikasi Mikroalga dari Divisi Chlorophyta di Waduk Sumber Air Jaya Dusun Krebet Kecamatan Bululawang Kabupaten Malang*. 8, 20–22.
- Fernandes, T., & Cordeiro, N. (2021). Microalgae as sustainable biofactories to produce high-value lipids: Biodiversity, exploitation, and biotechnological applications. *Marine Drugs*, 19(10), 1–26. <https://doi.org/10.3390/md19100573>
- Fu, W., Nelson, D. R., Yi, Z., Xu, M., Khraiwesh, B., & Jijakli, K. (2017). *Bioactive Compounds From Microalgae : Current Development and Prospects*. 54, 199–225. <https://doi.org/10.1016/B978-0-444-63929-5.00006-1>
- Fu, W., Nelson, D. R., Yi, Z., Xu, M., Khraiwesh, B., Jijakli, K., Chaiboonchoe, A., Alzahmi, A., Al-Khairiy, D., Brynjolfsson, S., & Salehi-Ashtiani, K. (2017). Bioactive Compounds From Microalgae: Current Development and Prospects. *Studies in Natural Products Chemistry*, 54(November 2019), 199–225. <https://doi.org/10.1016/B978-0-444-63929-5.00006-1>
- Gacheva, G. V., & Gigova, L. G. (2014). *Biological activity of microalgae can be enhanced by manipulating the cultivation temperature and irradiance*. 9(12).

<https://doi.org/10.2478/s11535-014-0350-x>

- Goris, K., Muylaert, K., Fraeye, I., Foubert, I., De Brabanter, J., & De Cooman, L. (2012). Antioxidant potential of microalgae in relation to their phenolic and carotenoid content. *Journal of Applied Phycology*, 24(6), 1477–1486. <https://doi.org/10.1007/s10811-012-9804-6>
- Gomes, D., Vivian, C., Xavier, L. P., Vasconcelos, S., Borges, R., Maria, S., Faustino, M., Paula, M., Schneider, C., & Santos, A. V. (2021). *Glucosidase Inhibitors Screening in Microalgae and Cyanobacteria Isolated from the Amazon and Proteomic Analysis of Inhibitor Producing Synechococcus sp . GFB01*. 1–24.
- González-Fernández, C., & Ballesteros, M. (2012). Linking microalgae and cyanobacteria culture conditions and key-enzymes for carbohydrate accumulation. *Biotechnology Advances*, 30(6), 1655–1661. <https://doi.org/10.1016/j.biotechadv.2012.07.003>
- González-Montoya, M., Hernández-Ledesma, B., Mora-Escobedo, R., & Martínez-Villaluenga, C. (2018). Bioactive peptides from germinated soybean with anti-diabetic potential by inhibition of dipeptidyl peptidase-IV,  $\alpha$ -amylase, and  $\alpha$ -glucosidase enzymes. *International Journal of Molecular Sciences*, 19(10). <https://doi.org/10.3390/ijms19102883>
- Guedes, I. A., de Magalhães, C. S., & Dardenne, L. E. (2014). Receptor-ligand molecular docking. *Biophysical Reviews*, 6(1), 75–87. <https://doi.org/10.1007/s12551-013-0130-2>
- Gutiérrez-Pliego, L. E., Martínez-Carrillo, B. E., Reséndiz-Albor, A. A., Arciniega-Martínez, I. M., Escoto-Herrera, J. A., Rosales-Gómez, C., & Valdés-Ramos, R. (2018). Effect of Supplementation With  $n-3$  Fatty Acids Extracted From Microalgae on Inflammation Biomarkers From Two Different Strains of Mice. *Journal of Lipids*, 2018, 1–10. <https://doi.org/10.1155/2018/4765358>
- Handra, I., Syafrizayanti, S., & Chadir, Z. (2019). Isolasi dan Identifikasi Mikroalga Sebagai Sumber Antioksidan dari Perairan Tirtasari Sonsang, Agam, Sumatera Barat. *Chimica et Natura Acta*, 7(1), 7. <https://doi.org/10.24198/cna.v7.n1.20076>
- Hanifzadeh, M., Cerdan, E., & Viamajala, S. (2018). Production of lipid and carbohydrate from microalgae without compromising biomass productivities : Role of Ca and Mg. *Renewable Energy*, 127, 989–997. <https://doi.org/10.1016/j.renene.2018.05.012>
- Heffernan, N., Smyth, T. J., FitzGerald, R. J., Vila-Soler, A., Mendiola, J., Ibáñez, E., & Brunton, N. P. (2016). Comparison of extraction methods for selected carotenoids from macroalgae and the assessment of their seasonal/spatial variation. *Innovative Food Science and Emerging Technologies*, 37, 221–228. <https://doi.org/10.1016/j.ifset.2016.06.004>

- Hempel, N., Petrick, I., & Behrendt, F. (2012). Biomass productivity and productivity of fatty acids and amino acids of microalgae strains as key characteristics of suitability for biodiesel production. *Journal of Applied Phycology*, 24(6), 1407–1418. <https://doi.org/10.1007/s10811-012-9795-3>
- Hena, S., Abida, N., & Tabassum, S. (2015). Screening of facultative strains of high lipid producing microalgae for treating surfactant mediated municipal wastewater. *RSC Advances*, 5(120), 98805–98813. <https://doi.org/10.1039/c5ra20019a>
- Hidayat, E., W, I. K., Irhas, M., Sidiq, F., & Susanti, R. (2015). Analysis of Proximate and Protein Profile of Kefir from Fermented Goat and Cow Milk. *Biosaintifika: Journal of Biology & Biology Education*, 7(2), 2–6. <https://doi.org/10.15294/biosaintifika.v7i2.3950>
- Huo, S., Chen, X., Zhu, F., Zhang, W., Chen, D., Jin, N., Cobb, K., Cheng, Y., Wang, L., & Ruan, R. (2020). Bioresource Technology Magnetic field intervention on growth of the filamentous microalgae Tribonema sp . in starch wastewater for algal biomass production and nutrients removal: Influence of ambient temperature and operational strategy. *Bioresource Technology*, 303(January), 122884. <https://doi.org/10.1016/j.biortech.2020.122884>
- Hussein, R. A., Salama, A. A. A., El Naggar, M. E., & Ali, G. H. (2019). Medicinal impact of microalgae collected from high rate algal ponds; phytochemical and pharmacological studies of microalgae and its application in medicated bandages. *Biocatalysis and Agricultural Biotechnology*, 20(May), 101237. <https://doi.org/10.1016/j.bcab.2019.101237>
- Hwan, Y., Han, S., Oh, B., Soo, H., Seo, M., Kim, S., & Choi, Y. (2022). Bioresource Technology Microalgal secondary metabolite productions as a component of biorefinery: A review. *Bioresource Technology*, 344(PA), 126206. <https://doi.org/10.1016/j.biortech.2021.126206>
- IDF Diabetes Atlas*. (2025).
- Ighodaro, O. M. (2018). Molecular pathways associated with oxidative stress in diabetes mellitus. *Biomedicine and Pharmacotherapy*, 108(August), 656–662. <https://doi.org/10.1016/j.bioph.2018.09.058>
- Illman, A. M., Scragg, A. H., & Shales, S. W. (2000). Increase in Chlorella strains calorific values when grown in low nitrogen medium. 27, 631–635.
- Islam, R., Hassan, A., Sulebele, G., Orosco, C., & Roustaian, P. (2003). Influence of Temperature on Growth and Biochemical Composition of Spirulina platensis and S. fusiformis. *Iranian Int. J. Sci*, 4(2), 97–106.
- Ismail, A. S., Rizal, Y., & Kasim, A. (2021). Identification of bioactive compounds in

*gambier (Uncaria gambir) liquid by-product in West Sumatra Indonesia.* 22(3), 1474–1480. <https://doi.org/10.13057/biodiv/d220351>

Jacob-Lopes, E., Maroneze, M. M., Deprá, M. C., Sartori, R. B., Dias, R. R., & Zepka, L. Q. (2019). Bioactive food compounds from microalgae: an innovative framework on industrial biorefineries. *Current Opinion in Food Science*, 25, 1–7. <https://doi.org/10.1016/j.cofs.2018.12.003>

Je, S., & Yamaoka, Y. (2022). Biotechnological Approaches for Biomass and Lipid Production Using Microalgae *< i>Chlorella</i>* and Its Future Perspectives. *Journal of Microbiology and Biotechnology*, 32(11), 1357–1372. <https://doi.org/10.4014/jmb.2209.09012>

Juárez, Á. B., Vélez, C. G., Iñiguez, A. R., Martínez, D. E., Rodríguez, M. C., Vigna, M. S., & De Molina, M. D. C. R. (2011). A Parachlorella kessleri (Trebouxiophyceae, Chlorophyta) strain from an extremely acidic geothermal pond in Argentina. *Phycologia*, 50(4), 413–421. <https://doi.org/10.2216/10-79.1>

Kalin, M. F., Goncalves, M., John-Kalarickal, J., & Fonseca, V. (2017). Pathogenesis of type 2 diabetes mellitus. *Principles of Diabetes Mellitus: Third Edition*, 267–277. [https://doi.org/10.1007/978-3-319-18741-9\\_13](https://doi.org/10.1007/978-3-319-18741-9_13)

Kaneto, H. (2015). Pathophysiology of type 2 diabetes mellitus. *Nihon Rinsho. Japanese Journal of Clinical Medicine*, 73(12), 2003–2007. <https://doi.org/10.1093/med/9780199235292.003.1336>

Kaushik, A., Sangtani, R., Parmar, H. S., & Bala, K. (2023). Algal metabolites: Paving the way towards new generation antidiabetic therapeutics. *Algal Research*, 69(June 2022), 102904. <https://doi.org/10.1016/j.algal.2022.102904>

Khaw, Y. S., Khong, N. M. H., Shaharuddin, N. A., & Yusoff, F. M. (2020). A simple 18S rDNA approach for the identification of cultured eukaryotic microalgae with an emphasis on primers. *Journal of Microbiological Methods*, 172(February). <https://doi.org/10.1016/j.mimet.2020.105890>

Kreckhoff, R. L., Ngangi, E. L. A., Undap, S. L., & Kusen, D. J. (2019). Crude extracts of *Kappaphycus alvarezii* algae cultivated in several seaweed production centers in North Sulawesi, Indonesia as immunostimulant. *AACL Bioflux*, 12(2), 678–686.

Kumoro, A. C. (2012). *Potency of Microalgae as Biodiesel Source in Indonesia*. 1, 23–27.

Lambrinidis, G., Vallianatou, T., & Tsantili-Kakoulidou, A. (2015). In vitro, in silico and integrated strategies for the estimation of plasma protein binding. A review. *Advanced Drug Delivery Reviews*, 86, 27–45. <https://doi.org/10.1016/j.addr.2015.03.011>

Landon, R., Gueguen, V., Petite, H., Letourneur, D., Pavon-Djavid, G., & Anagnostou,

- F. (2020). Impact of Astaxanthin on Diabetes Pathogenesis and Chronic Complications. *Marine Drugs*, 18(7), 1–20. <https://doi.org/10.3390/md18070357>
- Lankatillake, C., Huynh, T., & Dias, D. A. (2019). Understanding glycaemic control and current approaches for screening antidiabetic natural products from evidence - based medicinal plants. *Plant Methods*, 1–35. <https://doi.org/10.1186/s13007-019-0487-8>
- Lankatillake, C., Luo, S., Flavel, M., Lenon, G. B., Gill, H., Huynh, T., & Dias, D. A. (2021). Screening natural product extracts for potential enzyme inhibitors : protocols , and the standardisation of the usage of blanks in  $\alpha$  - amylase ,  $\alpha$  - glucosidase and lipase assays. *Plant Methods*, 1–19. <https://doi.org/10.1186/s13007-020-00702-5>
- Lara, M., & Graciano, G. (2019). Biomass recovery and lipid extraction processes for microalgae biofuels production : A review. *Renewable and Sustainable Energy Reviews*, 107(January), 87–107. <https://doi.org/10.1016/j.rser.2019.01.064>
- Li, C., Liu, T., Cui, X., Uss, A. S., & Cheng, K.-C. (2007). Development of in vitro pharmacokinetic screens using Caco-2, human hepatocyte, and Caco-2/human hepatocyte hybrid systems for the prediction of oral bioavailability in humans. *Journal of Biomolecular Screening*, 12(8), 1084–1091. <https://doi.org/10.1177/1087057107308892>
- Liang, N., & Kitts, D. D. (2014). Antioxidant Property of Coffee Components: Assessment of Methods that Define Mechanisms of Action. 19180–19208. <https://doi.org/10.3390/molecules191119180>
- Lichtenthaler, H. K. (1987). Chlorophyll and Carotenoid Determination: pigments of photosynthetic biomembranes. *Methods in Enzymology*, 8(148), 349–382.
- Listyani, T. A., Herowati, R., & Djamil, A. D. (2019). Analisis Docking Molekuler Senyawa Derivat Phthalimide sebagai Inhibitor Non-Nukleosida HIV-1 Reverse Transcriptase Molecular Docking Analysis of Derivate Phthalimide Compounds as Non-Nucleosida HIV-1 Reverse Transcriptase Inhibitor. 15(2), 123–134.
- Lopes, M., Soares, J., Bezerra, B., & Batista-silva, W. (2020). Bioresource Technology Extraction of proteins from the microalga Scenedesmus obliquus BR003 followed by lipid extraction of the wet deproteinized biomass using hexane and ethyl acetate. *Bioresource Technology*, 307(January), 123190. <https://doi.org/10.1016/j.biortech.2020.123190>
- Luu, T. N., Alsafras, Z., Corato, A., Corsaro, D., Le Anh, H., Eppe, G., & Remacle, C. (2020). Isolation and characterization of two microalgal isolates from Vietnam with potential for food, feed, and biodiesel production. *Energies*, 13(4). <https://doi.org/10.3390/en13040898>

- M. Ahsan B. Habib Mashuda. (2008). *FAO Fisheries and Aquaculture Circular No . 1034 A REVIEW ON CULTURE , PRODUCTION AND USE OF SPIRULINA AS FOOD FOR HUMANS AND FEEDS FOR* (Vol. 1034, Issue 1034).
- Maadane, A., Merghoub, N., Ainane, T., El Arroussi, H., Benhima, R., Amzazi, S., Bakri, Y., & Wahby, I. (2015). Antioxidant activity of some Moroccan marine microalgae: Pufa profiles, carotenoids and phenolic content. *Journal of Biotechnology*, 215, 13–19. <https://doi.org/10.1016/j.biotech.2015.06.400>
- Maheshwari, N., Mishra, A., & Srivastava, S. (2021). *Algal Biofuel: A Sustainable Approach for Fuel of Future Generation*. January. <https://doi.org/10.1007/978-981-15-7493-1>
- Mallikarjun Gouda, K. G., Kavitha, M. D., & Sarada, R. (2015). Antihyperglycemic, Antioxidant and Antimicrobial Activities of the Butanol Extract from Spirulina Platensis. *Journal of Food Biochemistry*, 39(5), 594–602. <https://doi.org/10.1111/jfbc.12164>
- Mardianingrum, R., Roesman, K., Susanti, S., Nuraisah, A., Farmasi, P., Bakti, S., Husada, T., Cilolohan, J., & Kota, N. (2021). *Studi In Silico Senyawa 1 , 4 -Naphthalenedione- 2 -Ethyl- 3 -Hydroxy sebagai Antiinflamasi dan Antikanker Payudara Preparasi Ligan dan Protein*. 17(1), 83–95. <https://doi.org/10.20961/alchemy.17.1.43979.83-95>
- Mikroalga, K., Sungai, D. I., Kota, K., Armoko, H., Epriyaningsih, S., Megang, S., Kelingi, S., Mesat, S., Beliti, S., & Kati, S. (2017). *LUBUKLINGGAU*. 4(September), 201–205.
- Milledge, J. J. (2011). Commercial application of microalgae other than as biofuels: A brief review. *Reviews in Environmental Science and Biotechnology*, 10(1), 31–41. <https://doi.org/10.1007/s11157-010-9214-7>
- Mosquera, K., Lucien, D., Santos, O., Alberto, J., & Costa, V. (2021). Magnetic field as promoter of growth in outdoor and indoor assays of Chlorella fusca. *Bioprocess and Biosystems Engineering*, 0123456789. <https://doi.org/10.1007/s00449-021-02526-6>
- Naimi, M., Vlavcheski, F., Shamshoum, H., & Tsiani, E. (2017). Rosemary extract as a potential anti-hyperglycemic agent: Current evidence and future perspectives. *Nutrients*, 9(9), 1–19. <https://doi.org/10.3390/nu9090968>
- Nasirian, F., Dadkhah, M., Moradi-Kor, N., & Obeidavi, Z. (2018). Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy Dovepress effects of Spirulina platensis microalgae on antioxidant and anti-inflammatory factors in diabetic rats. *Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy*, 11–375. <http://dx.doi.org/10.2147/DMSO.S172104>

- Nazarko, L. (2016). Diabetes series, 2. Diagnosis of diabetes mellitus. *British Journal of Healthcare Assistants*, 10(9), 422–428. <https://doi.org/10.12968/bjha.2016.10.9.422>
- Nimse, S. B., & Pal, D. (2015a). Free radicals, natural antioxidants, and their reaction mechanisms. *RSC Advances*, 5(35), 27986–28006. <https://doi.org/10.1039/c4ra13315c>
- Nimse, S. B., & Pal, D. (2015b). Free radicals, natural antioxidants, and their reaction mechanisms. *RSC Advances*, 5(35), 27986–28006. <https://doi.org/10.1039/c4ra13315c>
- Nurhasnawati, H., Sundu, R., Sapri, Supriningrum, R., Kuspradini, H., & Arung, E. T. (2019). Antioxidant activity, total phenolic and flavonoid content of several indigenous species of ferns in East Kalimantan, Indonesia. *Biodiversitas*, 20(2), 576–580. <https://doi.org/10.13057/BIODIV/D200238>
- Ogurtsova, K., da Rocha Fernandes, J. D., Huang, Y., Linnenkamp, U., Guariguata, L., Cho, N. H., Cavan, D., Shaw, J. E., & Makaroff, L. E. (2017). IDF Diabetes Atlas: Global estimates for the prevalence of diabetes for 2015 and 2040. *Diabetes Research and Clinical Practice*, 128, 40–50. <https://doi.org/10.1016/j.diabres.2017.03.024>
- Pace, C. N., Horn, G., Hebert, E. J., Bechert, J., Shaw, K., Urbanikova, L., Scholtz, J. M., & Sevcik, J. (2001). Tyrosine hydrogen bonds make a large contribution to protein stability. *Journal of Molecular Biology*, 312(2), 393–404. <https://doi.org/10.1006/jmbi.2001.4956>
- Pagadala, N. S., Syed, K., & Tuszyński, J. (2017). Software for molecular docking: a review. *Biophysical Reviews*, 9(2), 91–102. <https://doi.org/10.1007/s12551-016-0247-1>
- Paliwal, C., Mitra, M., Bhayani, K., Bharadwaj, S. V. V., Ghosh, T., Dubey, S., & Mishra, S. (2017). Abiotic stresses as tools for metabolites in microalgae. *Bioresource Technology*, 244, 1216–1226. <https://doi.org/10.1016/j.biortech.2017.05.058>
- Pankaj Modi. (2007). Diabetes Beyond Insulin: Review of New Drugs for Treatment of Diabetes Mellitus. *Current Drug Discovery Technologies*, 4(1), 39–47. <https://doi.org/10.2174/157016307781115476>
- Patil, L., & Kaliwal, B. B. (2019). Microalga Scenedesmus bajacalifornicus BBKLP-07, a new source of bioactive compounds with in vitro pharmacological applications. *Bioprocess and Biosystems Engineering*, 42(6), 979–994. <https://doi.org/10.1007/s00449-019-02099-5>
- Pekkoh, J., Phinyo, K., Thurakit, T., Lomakool, S., & Duangjan, K. (2022). *Lipid*

*Profile , Antioxidant and Antihypertensive Activity , and Computational Molecular Docking of Diatom Fatty Acids as ACE Inhibitors.*

- Phang, S. M., Mustafa, E. M., Ambati, R. R., Sulaiman, N. M. N., Lim, P. E., Majid, N. A., Dommange, X., Schwob, C., & Liew, K. E. (2015). Checklist of microalgae collected from different habitats in Peninsular Malaysia for selection of algal biofuel feedstocks. *Malaysian Journal of Science*, 34(2), 141–167. <https://doi.org/10.22452/mjs.vol34no2.2>
- Phaniendra, A., Jestadi, D. B., & Periyasamy, L. (2015). Free Radicals: Properties, Sources, Targets, and Their Implication in Various Diseases. *Indian Journal of Clinical Biochemistry*, 30(1), 11–26. <https://doi.org/10.1007/s12291-014-0446-0>
- Piotrowska, A., Andrzej, N., Urszula, B., Monika, K., Marta, B., & Karwel, T. (2018). Growth , Metabolite Profile , Oxidative Status , and Phytohormone Levels in the Green Alga *Acutodesmus obliquus* Exposed to Exogenous Auxins and Cytokinins. *Journal of Plant Growth Regulation*, 0(0), 0. <https://doi.org/10.1007/s00344-018-9816-9>
- Polonsky, K. S., & Burant, C. F. (2016). Disorders of Carbohydrate and fat metabolism. In *Williams Textbook of Endocrinology* (Thirteenth). Elsevier Inc. <https://doi.org/10.1016/B978-0-323-29738-7.00031-9>
- Prabhakar, P. K., & Doble, M. (2011). Mechanism of action of natural products used in the treatment of diabetes mellitus. *Chinese Journal of Integrative Medicine*, 17(8), 563–574. <https://doi.org/10.1007/s11655-011-0810-3>
- Prasetiawati, R., Suherman, M., & Permana, B. (2021). *Molecular Docking Study of Anthocyanidin Compounds Against Epidermal Growth Factor Receptor (EGFR ) as Anti-Lung Cancer Studi Molecular Docking Senyawa Antosianidin Terhadap Epidermal Growth Factor Receptor (EGFR ) Sebagai Anti Kanker Paru*. 8(1).
- Priatni, S., Budiwati, T. A., Ratnaningrum, D., Kosasih, W., Andryani, R., Susanti, H., & Susilaningsih, D. (2016). Antidiabetic screening of some Indonesian marine cyanobacteria collection. *Biodiversitas*, 17(2), 642–646. <https://doi.org/10.13057/biodiv/d170236>
- Přibyl, P., Cepák, V., Kaštánek, P., & Zachleder, V. (2015). Elevated production of carotenoids by a new isolate of *Scenedesmus* sp. *Algal Research*, 11(April), 22–27. <https://doi.org/10.1016/j.algal.2015.05.020>
- Qamar, H., Hussain, K., Soni, A., Khan, A., Hussain, T., & Chénais, B. (2021). Cyanobacteria as Natural Therapeutics and Pharmaceutical Potential: Role in Antitumor Activity and as Nanovectors. *Molecules*, 26(1), 247. <https://doi.org/10.3390/molecules26010247>
- Qu, W., Zhang, C., Zhang, Y., & Ho, S. (2019). Bioresource Technology Optimizing

- real swine wastewater treatment with maximum carbohydrate production by a newly isolated indigenous microalga *Parachlorella kessleri*. *Bioresource Technology*, 289(May), 121702. <https://doi.org/10.1016/j.biortech.2019.121702>
- Rachidi, F., Benhima, R., Kasmi, Y., Sbabou, L., & Arroussi, H. El. (2021). Evaluation of microalgae polysaccharides as biostimulants of tomato plant defense using metabolomics and biochemical approaches. *Scientific Reports*, 11(1), 1–16. <https://doi.org/10.1038/s41598-020-78820-2>
- Ratomski, P., & Hawrot-paw, M. (2021). Influence of nutrient-stress conditions on chlorella vulgaris biomass production and lipid content. *Catalysts*, 11(5). <https://doi.org/10.3390/catal11050573>
- Ricken, A., Dimitrov, A., Larissa, C., Fiorini, A., Estelita, D., Trigueros, G., & Gruska, E. (2019). Isolation and identification of new microalgae strains with antibacterial activity on food-borne pathogens. Engineering approach to optimize synthesis of desired metabolites. *Biochemical Engineering Journal*, 144(August 2018), 28–39. <https://doi.org/10.1016/j.bej.2019.01.007>
- Russell, C., Rodriguez, C., & Yaseen, M. (2022). High-value biochemical products & applications of freshwater eukaryotic microalgae. *Science of the Total Environment*, 809, 151111. <https://doi.org/10.1016/j.scitotenv.2021.151111>
- Saini, V. (2010). Molecular mechanisms of insulin resistance in type 2 diabetes mellitus. *World Journal of Diabetes*, 1(3), 68. <https://doi.org/10.4239/wjd.v1.i3.68>
- Santiago-morales, I. S., Trujillo-valle, L., & Márquez-rocha, F. J. (2018). *Tocopherols, Phycocyanin and Superoxide Dismutase from Microalgae: as Potential Food Antioxidants*. 5(1), 19–27.
- Santoni, A., Kartika, M. Z., & Aziz, H. (2017). *Antioxidant activity and total phenolic content of ethyl acetate extract and fractions of Lantana camara L. leaf* CODEN ( USA ): PCHHAX *Antioxidant activity and total phenolic content of ethyl acetate extract and fractions of Lantana camara L. leaf*. January 2016.
- Sapkota, B. K., Khadayat, K., Adhikari, B., Poudel, D. K., Niraula, P., Budhathoki, P., Aryal, B., Basnet, K., Ghimire, M., Marahatha, R., & Parajuli, N. (2021). Phytochemical Analysis, Antidiabetic Potential and in-silico Evaluation of Some Medicinal Plants. *Pharmacognosy Research*, 13(3), 140–148. <https://doi.org/10.5530/pres.13.3.6>
- Saraf, C., & Dutt, K. (2021). Oleaginous potential of indigenously isolated fresh water microalgae for biofuel production. *International Journal of Sustainable Energy*, 40(4), 326–343. <https://doi.org/10.1080/14786451.2020.1806840>
- Sathasivam, R. (2018). *A Review of the Biological Activities of Microalgal Carotenoids*

*and Their Potential Use in Healthcare and Cosmetic Industries.*  
<https://doi.org/10.3390/md16010026>

Section, C. E. (1960). *The Protein and Composition of Algae , Chlorella 71105 ”.* 229–232.

Sekatresna, W., Dharma, A., Zein, R., & Chadir, Z. (2016a). Identification of blue-green algae uncultured oscillatoria sp IPOME-4 isolated from local industry effluent with the potential as  $\beta$ -carotene feedstock. *Der Pharma Chemica*, 8(12), 110–117.

Sekatresna, W., Dharma, A., Zein, R., & Chadir, Z. (2016b). *Identification of Blue-Green Algae Uncultured Oscillatoria sp IPOME-4 Isolated from Local Industry Effluent with The Potential as  $\beta$  -Carotene Feedstock.* 8(12), 110–117.

Selvaraju, K., Raguraman, V., Narayan, H., Hariprasad, P., & Malik, A. (2023). Spectral characterization and binding dynamics of bioactive compounds from Chlorella minutissima against  $\alpha$  -glucosidase : An in vitro and in silico approach. *Algal Research*, 75(September), 103281.  
<https://doi.org/10.1016/j.algal.2023.103281>

Senousy, H. H., Abd Ellatif, S., & Ali, S. (2020). Assessment of the antioxidant and anticancer potential of different isolated strains of cyanobacteria and microalgae from soil and agriculture drain water. *Environmental Science and Pollution Research*, 27(15), 18463–18474. <https://doi.org/10.1007/s11356-020-08332-z>

Senroy, S., & Pal, R. (2014). *Microalgae in Aquaculture : A Review with Special References to Nutritional Value and Fish Dietetics Microalgae in Aquaculture : A Review with Special References to Nutritional Value and Fish Dietetics.* September. <https://doi.org/10.1007/s12595-013-0089-9>

Setyaningsih, I., Bintang, M., & Madina, N. (2015). Potentially Antihyperglycemic from Biomass and Phycocyanin of Spirulina Fusiformis Voronikhin by in Vivo Test. *Procedia Chemistry*, 14, 211–215.  
<https://doi.org/10.1016/j.proche.2015.03.030>

Setyaningsih, I., Prasetyo, H., Agungpriyono, D. R., & Tarman, K. (2020). Antihyperglycemic activity of Porphyridium cruentum biomass and extra-cellular polysaccharide in streptozotocin-induced diabetic rats. *International Journal of Biological Macromolecules*, 156, 1381–1386.  
<https://doi.org/10.1016/j.ijbiomac.2019.11.178>

Sharma, Pallavi, Jha, A. B., Dubey, R. S., & Pessarakli, M. (2012). *Reactive Oxygen Species , Oxidative Damage , and Antioxidative Defense Mechanism in Plants under Stressful Conditions.* 2012. <https://doi.org/10.1155/2012/217037>

Sharma, Priyanka, Joshi, T., Joshi, T., Chandra, S., & Tamta, S. (2020). In silico

screening of potential antidiabetic phytochemicals from *Phyllanthus emblica* against therapeutic targets of type 2 diabetes. *Journal of Ethnopharmacology*, 248, 112268. <https://doi.org/10.1016/j.jep.2019.112268>

Siti Halimatul Munawaroh, H., Gumilar, G. G., Nurjanah, F., Yuliani, G., Aisyah, S., Kurnia, D., Wulandari, A. P., Kurniawan, I., Ningrum, A., Koyande, A. K., & Show, P. L. (2020). In-vitro molecular docking analysis of microalgae extracted phycocyanin as an anti-diabetic candidate. *Biochemical Engineering Journal*, 161(May), 107666. <https://doi.org/10.1016/j.bej.2020.107666>

Sun, L., Warren, F. J., & Gidley, M. J. (2019). Trends in Food Science & Technology Natural products for glycaemic control: Polyphenols as inhibitors of alpha-amylase. *Trends in Food Science & Technology*, 91(December 2018), 262–273. <https://doi.org/10.1016/j.tifs.2019.07.009>

Supplements, P. (2021). *Microalgae as Sources of High-Quality Protein for Human Food and Protein Supplements*. 2019, 1–18.

Syafrizayanti, S., Putri, A., Salim, M., & Kusnanda, A. J. (2023). Simulasi Inhibisi Aktivitas Enzim  $\alpha$ -Amilase dan  $\alpha$ -Glukosidase oleh Senyawa Bioaktif Mikroalga *Spirulina platensis*. *ALCHEMY Jurnal Penelitian Kimia*, 19(2), 223–233. <https://doi.org/10.20961/alchemy.19.2.73120.223-233>

Tamarai, K., Bhatti, J. S., & Reddy, P. H. (2019). Molecular and cellular bases of diabetes: Focus on type 2 diabetes mouse model-TallyHo. *Biochimica et Biophysica Acta - Molecular Basis of Disease*, 1865(9), 2276–2284. <https://doi.org/10.1016/j.bbadi.2019.05.004>

Tan, J. Sen, Lee, S. Y., Chew, K. W., Lam, M. K., Lim, J. W., Ho, S. H., & 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>

Taslimi, P., Kocyigit, U. M., Tüzün, B., & Kirici, M. (2020). Biological effects and molecular docking studies of Catechin 5-O-gallate: antioxidant, anticholinergics, antiepileptic and antidiabetic potentials. *Journal of Biomolecular Structure and Dynamics*, 0(0), 1–9. <https://doi.org/10.1080/07391102.2020.1840440>

Tasman, A. M., Dharma, A., & Syafrizayanti, S. R. S. (2020). *Jurnal Litbang Industri. Jurnal Litbang Industri*, 10(1), 61–71.

Tibbetts, S. M., Milley, J. E., & Lall, S. P. (2015). Chemical composition and nutritional properties of freshwater and marine microalgal biomass cultured in photobioreactors. *Journal of Applied Phycology*, 27(3), 1109–1119. <https://doi.org/10.1007/s10811-014-0428-x>

Tokuşoglu, O. and Ü. M. K. (2003). Biomass Nutrient Profiles of Three Microalgae:

*Journal of Food Science*, 68(4), 1144–1148.

- Tundis, R., Loizzo, M. R., & Menichini, F. (2010). Natural Products as α-Amylase and β-Glucosidase Inhibitors and their Hypoglycaemic Potential in the Treatment of Diabetes: An Update. *Mini-Reviews in Medicinal Chemistry*, 10(4), 315–331. <https://doi.org/10.2174/138955710791331007>
- Udayan, A., Pandey, A. K., Sirohi, R., Sreekumar, N., Sang, B. I., Sim, S. J., Kim, S. H., & Pandey, A. (2023). Production of microalgae with high lipid content and their potential as sources of nutraceuticals. *Phytochemistry Reviews*, 22(4), 833–860. <https://doi.org/10.1007/s11101-021-09784-y>
- Utari, F., Itam, A., Syafrizayanti, S., Putri, W. H., Ninomiya, M., Koketsu, M., Tanaka, K., & Efdi, M. (2019). Isolation of flavonol rhamnosides from Pometia pinnata leaves and investigation of α-glucosidase inhibitory activity of flavonol derivatives. *Journal of Applied Pharmaceutical Science*, 9(8), 53–65. <https://doi.org/10.7324/JAPS.2019.90808>
- Vidyashankar, S., VenuGopal, K. S., Swarnalatha, G. V., Kavitha, M. D., Chauhan, V. S., Ravi, R., Bansal, A. K., Singh, R., Pande, A., Ravishankar, G. A., & Sarada, R. (2015). Characterization of fatty acids and hydrocarbons of chlorophycean microalgae towards their use as biofuel source. *Biomass and Bioenergy*, 77(November 2018), 75–91. <https://doi.org/10.1016/j.biombioe.2015.03.001>
- Vieira, M. V., Turkiewicz, I. P., Tkacz, K., Fuentes-Grünwald, C., Pastrana, L. M., Fuciños, P., Wojdyło, A., & Nowicka, P. (2021). Microalgae as a potential functional ingredient: Evaluation of the phytochemical profile, antioxidant activity and in-vitro enzymatic inhibitory effect of different species. *Molecules*, 26(24). <https://doi.org/10.3390/molecules26247593>
- Wali, A. F., Dhaheri, Y. Al, Pillai, J. R., Mushtaq, A., Rao, P. G. M., Rabbani, S. A., Firdous, A., Elshikh, M. S., & Al Farraj, D. A. (2020). LC-MS phytochemical screening, in vitro antioxidant, antimicrobial and anticancer activity of microalgae nannochloropsis oculata extract. *Separations*, 7(4), 1–11. <https://doi.org/10.3390/separations7040054>
- Wang, F., Gao, B., Su, M., Dai, C., Huang, L., & Zhang, C. (2019). Bioresource Technology Integrated biorefinery strategy for tofu wastewater biotransformation and biomass valorization with the filamentous microalga Tribonema minus. *Bioresource Technology*, 292(August), 121938. <https://doi.org/10.1016/j.biortech.2019.121938>
- Weni, M., Safithri, M., & Seno, D. S. H. (2020). Molecular Docking of Active Compounds Piper crocatum on the A-Glucosidase Enzyme as Antidiabetic. *Indonesian Journal of Pharmaceutical Science and Technology*, 7(2), 64. <https://doi.org/10.24198/ijpst.v7i2.21120>

Xing, Y., Zhang, J., Wei, H., Zhang, H., Guan, Y., Wang, X., & Tong, X. (2019). Reduction of the PI3K/Akt related signaling activities in skeletal muscle tissues involves insulin resistance in intrauterine growth restriction rats with catch-up growth. *PLoS ONE*, 14(5), 1–16. <https://doi.org/10.1371/journal.pone.0216665>

Yaribeygi, H., Yaribeygi, A., Sathyapalan, T., & Sahebkar, A. (2019). Molecular mechanisms of trehalose in modulating glucose homeostasis in diabetes. *Diabetes and Metabolic Syndrome: Clinical Research and Reviews*, 13(3), 2214–2218. <https://doi.org/10.1016/j.dsx.2019.05.023>

Zulkarnain, M. I., & Kusumaningrum, H. P. (2023). *Identifikasi Molekuler Chlorella sorokiniana menggunakan Marka ITS dan 18S rDNA serta Produksi Karotenoid dengan Perlakuan Cahaya*. 12(2), 153–163. <https://doi.org/10.14710/buloma.v12i2.46705>

