

DAFTAR PUSTAKA

- Afrin, F., Ahsan, T., Mondal, M. N., Rasul, M. G., Afrin, M., Silva, A. A., Yuan, C., and Shah, A. K. M. A. 2023. Evaluation of Antioxidant and Antibacterial Activities of Some Selected Seaweeds from Saint Martin's Island of Bangladesh. *Food Chemistry Advances*. 3(7): 1-8.
- Agostino, S., Azzali, A., Casali, L., Taddei, P., and Grepioni, F. 2020. Environmentally Friendly Sunscreens: Mechanochemical Synthesis and Characterization of β - CD Inclusion Complexes of Avobenzone and Octinoxate with Improved Photostability. *ACS Sustainable Chemistry & Engineering*. 8(1): 13215-13225.
- Ahaik, F. A. M., Taufik, S. H. M., Johari, N. A. F., Abidin, A. A. Z., and Yusof, Z. N. B. 2022. Optimization of Nucleic Acid Extraction and Amplification of a Thiamine Biosynthesis Gene Fragment from Selected Malaysian Seaweeds. *Genes and Genetic Systems*. 97(5): 247-256.
- Ahyar, H., Maret, U. S., Andriani, H., Sukmana, D. J., Mada, U. G., Hardani, S.Pd., M. S., Nur Hikmatul Auliya, G. C. B., Helmina Andriani, M. S., Fardani, R. A., Ustiawaty, J., Utami, E. F., Sukmana, D. J., dan Istiqomah, R. R. 2020. Buku Metode Penelitian Kualitatif dan Kuantitatif. Pustaka Ilmu, Yogyakarta.
- Akinyemi, O. M. 2020. Antibiotic Resistance: An Investigation on Effectiveness of Antibiotics Treatment on Bacterial Growth. *OALib*. 07(05): 1-17.
- Alamsyah, R. 2016. Kesesuaian Parameter Kualitas Air untuk Budidaya Rumput Laut di Desa Panaikang Kabupaten Sinjai. *Jurnal Agrominansia*. 1(2): 61-70.
- Alamsyah, H. K., Widowati, I., dan Sabdono, A. 2014. Aktivitas Antibakteri Ekstrak Rumput Laut *Sargassum cinereum* (J Agardh) dari Perairan Pulau Panjang Jepara Terhadap Bakteri *Escherichia coli* dan *Staphylococcus epidermidis*. *Journal Of Marine Research*. 3: 69-78.
- de Alencar, D. B., de Carvalho, F. C. T., Rebouças, R. H., dos Santos, D. R., dos Santos Pires-Cavalcante, K. M., de Lima, R. L., Baracho, B. M., Bezerra, R. M., Viana, F. A., dos Fernandes Vieira, R. H. S., Sampaio, A. H., de Sousa, O. V., and Saker-Sampaio, S. 2016. Bioactive Extracts of Red Seaweeds *Pterocladiella capillacea* and *Osmundaria obtusiloba* (Floridophyceae: Rhodophyta) with Antioxidant and Bacterial Agglutination Potential. *Asian Pacific Journal of Tropical Medicine*. 9(4): 372-379.
- Alshehri, M. A., Aziz, A. T., Alzahrani, O., Alasmari, A., Ibrahim, S., Osman, G., and Bahattab, O. 2019. DNA-barcoding and Species Identification for some Saudi Arabia Seaweeds using rbcL Gene. *Journal of Pure and Applied Microbiology*. 13(4): 2035-2044.

- Alsufyani, T., Al-Otaibi, N., Alotaibi, N. J., M'sakni, N. H., and Alghamdi, E. M. 2023. GC Analysis, Anticancer, and Antibacterial Activities of Secondary Bioactive Compounds from Endosymbiotic Bacteria of Pomegranate Aphid and Its Predator and Protector. *Molecules*. **28**(10): 1-22.
- Altschul, S. F., Gish, W., Miller, W., Myers, E. W., and Lipman, D. J. 1990. Basic Local Alignment Search Tool. *Journal of Molecular Biology*. **215**(3): 403-410.
- Amaranggana, L. dan Wathoni, N. 2017. Manfaat Alga Merah (Rhodophyta) Sebagai Sumber Obat dari Bahan Alam. *Farmasetika*. **2**(1): 16-19.
- Andrews, R. M., Bollar, G. E., Giattina, A. S., Dalecki, A. G., Wallace Jr, J. R., Frantz, L., Eschlmann, K., Covarrubias-Zambrano, O., Keith, J. D., Duverger, A., Wagner, F., Wolschendorf, F., Bossmann, S. H., Birket, S. E., et al. 2023. Repurposing Sunscreen as An Antibiotic: Zinc-Activated Avobenzone Inhibits Methicillin-Resistant *Staphylococcus aureus*. *Metallomics*. **15**(9).
- Andriani, Y., Syamsumir, D. F., Yee, T. C., Harisson, F. S., Herng, G. M., Abdullah, S. A., Orosco, C. A., Ali, A. M., Latip, J., Kikuzaki, H., and Mohamad, H. 2016. Biological Activities of Isolated Compounds from Three Edible Malaysian Red Seaweeds, *Gracilaria changii*, *G. manilaensis* and *Gracilaria* sp. *Natural Product Communications*. **11**(8): 1117-1120.
- Anisa, A. N. and Chasani, A. R. 2022. Numerical Taxonomy of Marine Macroalgae *Gracilariaeae* from Southern Coast of Gunungkidul Based on Morpho-Anatomical and Phytochemical Characters. *Proceedings of the 7th International Conference on Biological Science (ICBS 2021)*. **22**: 124-130.
- Ariani, A., Nurgayah, W., dan Afu, L. O. A. 2017. Komposisi dan Distribusi Makroalga Berdasarkan Tipe Substrat di Perairan Desa Lalowaru Kecamatan Moramo Utara. *Sapa Laut*. **2**(1): 25-30.
- Ariyani, N. and Sari, R. A. 2018. *Doxycycline and Ciprofloxacin Resistance in Escherichia coli Isolated from Layer Feces*, Doctoral Thesis, Universitas Airlangga.
- Arsianti, A. and Astika, Y. 2018. Phytochemical Analysis and Anticancer Activity of Seaweed *Gracilaria verrucosa* against Colorectal HCT-116 Cells. *Oriental Journal of Chemistry*. **34**(3): 1257-1262.
- Asthisa, D., Mantiri, D. M. H., Sumilat, D. A., Rompas, R. M., Sinjal, A. C., and Mantiri, R. O. S. E. 2021. Bioactive Compounds in The Algae of *Kappaphycus alvarezii* from Belang waters, Southeast Minahasa Regency. *Aquatic Science & Management*. **9**(2): 75-80.
- Aulia, U., Helmi, T. Z., Darmawi, D., dan F, F. 2022. Isolasi dan Identifikasi Bakteri *Micrococcus luteus* dan *Staphylococcus epidermidis* pada Ambing Sapi Aceh. *Jurnal Ilmiah Mahasiswa Veteriner*. **6**(2): 46-56.

- Ayuningrum, P. I., Afrianto, E., dan Mulyani, Y. 2012. Keragaman Genetik Rumput Laut *Eucheuma* spp. dari Sukabumi, Jawa Barat Berdasarkan Metode RAPD PCR. *Jurnal Perikanan dan Kelautan*. 3(4): 337–345.
- Aziz, L. dan Chasani, A. R. 2020. Perbandingan Struktur dan Komposisi Makroalga di Pantai Drini dan Pantai Krakal. *Jurnal Kelautan*. 13(2): 75–86.
- Bahrin, B., Soekamto, N., and Firdaus, F. 2023. In Vitro and In Silico Analysis for Antibacterial Activity of Various Extracts of *Gracilaria salicornia* (Rhodophyta) from Selayar Islands, Indonesia. *Egyptian Journal of Chemistry*. 64(12): 7103–7112.
- Balouiri, M., Sadiki, M., and Ibnsouda, S. K. 2016. Methods for in vitro Evaluating Antimicrobial Activity: A review. *Journal of Pharmaceutical Analysis*. 6(2): 71–79.
- Bawaja, P., Kumar, S., Sahoo, D., and Levine, I. 2016. Biology of Seaweeds. Elsevier Inc.
- Bera, S., Zhanel, G. G., and Schweizer, F. 2008. Design, Synthesis, and Antibacterial Activities of Neomycin-Lipid Conjugates: Polycationic Lipids with Potent Gram-Positive Activity. *Journal of Medicinal Chemistry*. 51(19): 6160–6164.
- Berardesca, E., Zuberbier, T., Sanchez Viera, M., and Marinovich, M. 2019. Review of The Safety of Octocrylene Used as An Ultraviolet Filter in Cosmetics. *Journal of the European Academy of Dermatology and Venereology*. 33(S7): 25–33.
- Bhushan, S., Veeragurunathan, V., Bhagiya, B. K., Krishnan, S. G., Ghosh, A., and Mantri, V. A. 2023. Biology, Farming and Applications of Economically Important Red Seaweed *Gracilaria edulis* (S. G. Gmelin) P. C. Silva: A Concise Review. *Journal of Applied Phycology*. 35(3): 983–996.
- Bintari, S. H., Dyah, A., Eka, V., dan Citra, R. 2008. Efek Inokulasi Bakteri *Micrococcus luteus* Terhadap Pertumbuhan Jamur Benang dan Kandungan Isoflavon pada Proses Pengolahan Tempe. *Biosaintifika*. 1(1): 1–8.
- Boro, S. E., Suartha, I., dan Sudimartini, L. M. 2018. Efektivitas Ekstrak Daun Mimba terhadap *Micrococcus Luteus* yang Diisolasi dari Anjing Penderita Dermatitis Kompleks. *Indonesia Medicus Veterinus*. 7(5): 588–596.
- Bothwell, J. H. 2023. Seaweeds of The World: A Giude to Every Order. Princeton University Press, New Jersey.
- Brown, A. and Smith, H. 2015. Benson's Microbiological Applications, Laboratory Manual In General Microbiology. Mc Graw Hill Education, New York.

Cao, L., Yu, I. K. M., Cho, D., Wang, D., Tsang, D. C. W., Zhang, S., Ding, S., Wang, L., and Ok, Y. S. 2018. Microwave-Assisted Low-Temperature Hydrothermal Treatment of Red Seaweed (*Gracilaria lemaneiformis*) for Production of Levulinic Acid and Algae Hydrochar. *Bioresource Technology*. Advance Access published 2018: doi:10.1016/j.biortech.2018.11.013.

Carpena, M., Chamorro, F., Otero, P., Lourenc, C., Cao, H., and Prieto, M. A. 2022. Biological Properties and Potential of Compounds Extracted from Red Seaweeds. *Phytochem Rev.* **1**(1): 1–32.

Casillas-Vargas, G., Ocasio-Malavé, C., Medina, S., Morales-Guzmán, C., Del Valle, R. G., Carballeira, N. M., and Sanabria-Ríos, D. J. 2021. Antibacterial Fatty Acids: An Update of Possible Mechanisms of Action and Implications in The Development of The Next-Generation of Antibacterial Agents. *Progress in Lipid Research*. **82**(1): 1–10.

CDC. 2019. Antibiotic Resistance Threats in the United States, 2019.

Chagas, F. D. da S., Lima, G. C., dos Santos, V. I. N., Costa, L. E. C., de Sousa, W. M., Sombra, V. G., de Araújo, D. F., Barros, F. C. N., Marinho-Soriano, E., de Andrade Feitosa, J. P., de Paula, R. C. M., Pereira, M. G., and Freitas, A. L. P. 2020. Sulfated Polysaccharide from The Red Algae *Gelidiella acerosa*: Anticoagulant, Antiplatelet and Antithrombotic Effects. *International Journal of Biological Macromolecules*. **159**: 415–421.

Chhetri, B., Mojib, N., Moore, S. G., Delgadillo, D. A., Burch, J. E., Barrett, N. H., Gaul, D. A., Marquez, L., Soapi, K., Nelson, H. M., Quave, C. L., and Kubanek, J. 2023. Cryptic Chemical Variation in a Marine Red Alga as Revealed by Nontargeted Metabolomics. *ACS Omega*. **8**(15): 13899–13910.

Clish, C. B. 2015. Metabolomics : An Emerging But Powerful Tool for Precision Medicine. *Cold Spring Harbor Molecular Case Studies*. **1**(1): 1–6.

Corradini, D. 2011. Handbook of HPLC. CRC Press, New York.

Cotas, J., Leandro, A., Pacheco, D., Gonçalves, A. M. M., and Pereira, L. 2020. A Comprehensive Review of The Nutraceutical and Therapeutic Applications of Red Seaweeds (Rhodophyta). *Life*. **10**(3).

Culioli, G. 2021. Integration of LC/MS-based Molecular Networking and Classical Phytochemical Approach Allow in-depth Annotations of The Metabolome of Non-Model Organisms - The Case Study of The brown Seaweed *Taonia atomaria*. *Talanta*. **225**: 1–44.

Deng, C., Seidi, F., Yong, Q., Jin, X., Li, C., Zhang, X., Han, J., Liu, Y., Huang, Y., Wang, Y., Yuan, Z., and Xiao, H. 2022a. Antiviral/Antibacterial Biodegradable Cellulose Nonwovens as Environmentally Friendly and Bioprotective Materials with Potential to Minimize Microplastic Pollution.

- Journal of Hazardous Materials.* **424**: 127391.
- Deng, C., Seidi, F., Yong, Q., Jin, X., Li, C., Zheng, L., Yuan, Z., and Xiao, H. 2022b. Virucidal and Biodegradable Specialty Cellulose Nonwovens as Personal Protective Equipment Against COVID-19 Pandemic. *Journal of Advanced Research.* **39**: 147–156.
- Dhanani, T., Shah, S., Gajbhiye, N. A., and Kumar, S. 2017. Effect of Extraction Methods on Yield, Phytochemical Constituents and Antioxidant Activity of *Withania somnifera*. *Arabian Journal of Chemistry.* **10**(1): S1193–S1199.
- Du, J., Jiang, L., Chen, F., Hu, H., and Zhou, M. 2021. Cardiac Glycoside Ouabain Exerts Anticancer Activity via Downregulation of STAT3. *Frontiers in Oncology.* **11**(6): 1–11.
- Elhady, S. S., Habib, E. S., Abdelhameed, R. F. A., Goda, M. S., Hazem, R. M., Mehanna, E. T., Helal, M. A., Hosny, K. M., Diri, R. M., Hassanean, H. A., Ibrahim, A. K., Eltamany, E. E., Abdelmohsen, U. R., and Ahmed, S. A. 2022. Anticancer Effects of New Ceramides Isolated from the Red Sea Red Algae *Hypnea musciformis* in a Model of Ehrlich Ascites Carcinoma: LC-HRMS Analysis Profile and Molecular Modeling. *Marine Drugs.* **20**(1): 1–23.
- Ford, L., Stratakos, A. C., Theodoridou, K., Dick, J. T. A., Sheldrake, G. N., Linton, M., Corcionivoschi, N., and Walsh, P. J. 2020. Polyphenols from Brown Seaweeds as a Potential Antimicrobial Agent in Animal Feeds. *ACS Omega.* **5**(16): 9093–9103.
- Garcia-Vaquero, M., Rajauria, G., and Tiwari, B. 2020. Conventional Extraction Techniques: Solvent Extraction. Elsevier Inc., New York.
- Geraldino, P. J. L., Yang, E.-C., and Bu, S.-M. 2006. Morphology and Molecular Phylogeny of *Hypnea flexicaulis* (*Gigartinales*, *Rhodophyta*) from Korea. *Algae.* **21**(4): 417–423.
- Gomes, L., Monteiro, P., Cotas, J., Gonçalves, A. M. M., and Fernandes, C. 2022. Seaweeds Pigments and Phenolic Compounds with Antimicrobial Potential. *Biomolecular Concepts.* **13**(1): 89–102.
- Gonçalves, A., Fernandes, M., Lima, M., Silva, F., Castro, S., Sampaio, F., and Gomes, A. C. 2023. Nanotechnology to the Rescue : Therapeutic Strategies Based on Brown Algae for Neurodegenerative Diseases. *Applied Sciences.* **1**(3): 1–20.
- Guo, Z., Huang, S., Wang, J., and Feng, Y. L. 2020. Recent Advances in Non-Targeted Screening Analysis Using Liquid Chromatography - High Resolution Mass Spectrometry to Explore New Biomarkers for Human Exposure. *Talanta.* **219**(6): 121339.
- Hamid, S. S., Wakayama, M., Ichihara, K., Sakurai, K., Ashino, Y., Kadowaki, R.,

- Soga, T., and Tomita, M. 2019. Metabolome Profiling of Various Seaweed Species Discriminates Between Brown, Red, and Green Algae. *Planta*. **249**(6): 1921–1947.
- Hatmanti, A. 2000. Pengenalan *Bacillus* spp. *Oseana*. **25**(1): 31–41.
- Heikrujam, J., Kishor, R., and Mazumder, P. B. 2020. The Chemistry Behind Plant DNA Isolation Protocols, in *Biochemical Analysis Tools*. IntechOpen, Rijeka.
- Imania, O. 2021. *Potensi Prebiotik dan Identifikasi Molekuler Rumput Laut Merah (Rhodophyta) dari Pantai Selatan Kabupaten Gunungkidul*, Skripsi. Universitas Gadjah Mada.
- Kadi, A. 2014. Rumput Laut Sebagai produk Alam dari Perairan Indonesia. *Oseana*. **39**(3): 31–40.
- Kasanah, N., Amelia, W., Mukminin, A., Triyanto, and Isnansetyo, A. 2019. Antibacterial Activity of Indonesian Red Algae *Gracilaria edulis* Against Bacterial Fish Pathogens and Characterization of Active Fractions. *Natural Product Research*. **33**(22): 3303–3307.
- Kasanah, N., Setyiadi, S., Triyanto, T., dan Trialfhianty, T. I. 2018. Rumput Laut Indonesia: Keanekaragaman Rumput Laut di Gunungkidul, Yogyakarta. UGM Press, Yogyakarta.
- Kasanah, N., Triyanto, T., Seto, D. S., Amelia, W., and Isnansetyo, A. 2015. Review: Antibacterial Compounds From Red Seaweeds (Rhodophyta). *Indonesia Journal of Chemistry*. **15**(2): 201–209.
- El Kassas, H. Y. and Attia, A. A. 2014. Bactericidal Application and Cytotoxic Activity of Biosynthesized Silver Nanoparticles with An Extract of The Red Seaweed *Pterocladiella capillacea* on The HepG2 Cell Line. *Asian Pacific Journal of Cancer Prevention*. **15**(3): 1299–1306.
- Kim, S. K. 2012. Handbook of Marine Macroalgae: Biotechnology and Applied Phycology. Wiley-Blackwell, New York.
- Kolanjinathan, K. and Saranraj, P. 2014. Pharmacological Efficacy of Marine Seaweed *Gracilaria edulis* Extracts Against Clinical Pathogens. *Global Journal of Pharmacology*. **8**(2): 268–274.
- Krupnik, N., Israel, A., and Meiri, D. 2023. Seasonal Variation in The Metabolome Expression of *Jania rubens* (Rhodophyta) Reveals Eicosapentaenoic Acid as A Potential Anticancer Metabolite. *Scientific Reports*. **13**(1): 1–11.
- Kumari, N., Singh, S., Kumari, V., Kumar, S., Kumar, V., and Kumar, A. 2019. Ouabain Potentiates The Antimicrobial Activity of Aminoglycosides Against *Staphylococcus aureus*. *BMC Complementary and Alternative Medicine*. **19**(1): 1–12.

- Ladumor, M. K., Tiwari, S., Patil, A., Bhavsar, K., Jhajra, S., Prasad, B., and Singh, S. 2016. High-Resolution Mass Spectrometry in Metabolite Identification. Elsevier Ltd. **71**.
- Lantah, P. L., Montolalu, L. A. D. Y., dan Reo, A. R. 2017. Kandungan Fitokimia dan Aktivitas Antioksidan Ekstrak Metanol Rumput Laut *Kappaphycus alvarezii*. *Jurnal Media Teknologi Hasil Perikanan*. **5**(3): 167–173.
- Lee, J. M., Yang, E. C., Graf, L., Yang, J. H., Qiu, H., Zelzion, U., Chan, C. X., Stephens, T. G., Weber, A. P. M., Boo, G. H., Boo, S. M., Kim, K. M., Shin, Y., Jung, M., et al. 2018. Analysis of The Draft Genome of The Red Seaweed *Gracilaria* Provides Insights Into Genome Size Evolution in Rhodophyta. *Molecular Biology and Evolution*. **35**(8): 1869–1886.
- Lenaini, I. 2021. Teknik Pengambilan Sampel Purposive Dan Snowball Sampling. *Jurnal Kajian, Penelitian dan Pengembangan Pendidikan Sejarah*. **6**(1): 33–39.
- Liu, Y., Ma, Y., Chen, Z., Li, D., Liu, W., Huang, L., Zou, C., Cao, M. J., Liu, G. M., and Wang, Y. 2020. Antibacterial Activity of Sulfated Galactans from *Eucheuma serra* and *Gracilaria verrucosa* Against Diarrheagenic *Escherichia coli* via The Disruption of The Cell Membrane Structure. *Marine Drugs*. **18**(8).
- Lomartire, S. and Gonçalves, A. M. M. 2023. An Overview on Antimicrobial Potential of Edible Terrestrial Plants and Marine Macroalgae Rhodophyta and Chlorophyta Extracts. *Marine Drugs*. **21**(3): 1–35.
- Ludwiczuk, A., Wozniak, S., and Georgiev, M. I. 2017. Terpenoids, page. 233–266, in *Pharmacognosy*. Academic Press, New York.
- Madkour, F. F., El-Shoubaky, G. A., and Ebada, M. A. 2019. Antibacterial Activity of Some Seaweeds from the Red Sea Coast of Egypt. *Egyptian Journal of Aquatic Biology and Fisheries*. **23**(2): 265–274.
- Meinita, M. D. N., Akromah, N., Andriani, N., Setijanto, S., Harwanto, D., and Liu, T. 2021. Molecular Identification of *Gracilaria* species (*Gracilariales, Rhodophyta*) Obtained from The South Coast of Java Island, Indonesia. *Biodiversitas*. **22**(7): 3046–3056.
- Mendelsohn, E., Hagopian, A., Hoffman, K., Butt, C. M., Lorenzo, A., Congleton, J., Webster, T. F., and Stapleton, H. M. 2016. Nail Polish as A Source of Exposure to Triphenyl Phosphate. *Environment International*. **86**: 45–51.
- National Center for Biotechnology Information. 2023. PubChem Compound Summary for CID 69131857, Galaxolidone. Retrieved December 26, 2023 from <https://pubchem.ncbi.nlm.nih.gov/compound/Galaxolidone>.
- National Center for Biotechnology Information. 2024a. PubChem Compound Summary for CID 4454. Retrieved January 22, 2024 from <https://pubchem.ncbi.nlm.nih.gov/compound/4454>.

National Center for Biotechnology Information. 2024b. PubChem Compound Summary for CID 460895, 3,4-Di-O-galloylquinic acid. Retrieved January 16, 2024 from <https://pubchem.ncbi.nlm.nih.gov/compound/3,4-Di-O-galloylquinic-acid>.

Naveen, J., Baskaran, R., and Baskaran, V. 2021. Profiling of Bioactives and in vitro Evaluation of Antioxidant and Antidiabetic Property of Polyphenols of Marine Algae *Padina tetrastromatica*. *Algal Research*. **55**(2): 102250.

Nurjanah, G. S., Cahyadi, A. I., dan Windria, S. 2020. Kajian Pustaka : Resistensi *Escherichia coli* Terhadap Berbagai Macam Antibiotik pada Hewan dan Manusia. *Indonesia Medicus Veterinus*. **9**(6): 970–983.

Okiye, M. E. K., Velez, M. A., Sugai, J., Kinney, J., Giannobile, W. V, Tripathi, A., and Sherman, D. H. 2023. Investigating Metabolic Trends in the Oral Cavity to Identify Novel Metabolites. *bioRxiv*. 1–17.

de Oliveira, E. A. S., de Oliveira, J. A. S., Araújo, P. R., Tâmega, F. T. S., Coutinho, R., and Soares, A. R. 2023. Chemical Diversity and Antifouling Activity of Geniculate Calcareous Algae (*Corallinales*, Rhodophyta) from Brazil. *PeerJ*. **11**: 1–24.

Othman, M., Hassan, R., Harith, M. N., and Shah, A. 2018. Morphological Characteristics and Habitats of Red Seaweed *Gracilaria* spp . (*Gracilariaeae*, Rhodophyta) in Santubong and Asajaya , Sarawak , Malaysia. *Tropical Life Science Research*. **29**(1): 87–101.

Patarra, R. F., Iha, C., Pereira, L., and Neto, A. I. 2020. Concise Review of The Species *Pterocladiella capillacea* (S.G. Gmelin) Santelices & Hommersand. *Journal of Applied Phycology*. **32**(2): 787–808.

Patra, F., Kepel, R. C., Lumingas, L. J. L., Gerung, G. S., Kondoy, K. F., Sumilat, D. A., and Undap, S. L. 2021. Anatomical Characteristics of Macroalgal Species from Bombuyanoi Island, East Bolaang Mongondow Regency, North Sulawesi. *Aquatic Science and Management*. **9**(2): 55–62.

Paula, D. 2004. Seaweeds – A field Manual. National Institute of Oceanography, New Delhi.

Pérez-Alva, A., MacIntosh, A. J., Baigts-Allende, D. K., García-Torres, R., and Ramírez-Rodrigues, M. M. 2022. Fermentation of Algae to Enhance Their Bioactive Activity: A review. *Algal Research*. **64**: 102684.

Pérez, M. J., Falqué, E., and Domínguez, H. 2016. Antimicrobial Action of Compounds from Marine Seaweed. *Marine Drugs*. **14**(3).

Pharmawati, M., Basyar, W. M., and Astarini, I. A. 2020. Total Genomic DNA Extraction Studies from Seaweeds. *Advances in Tropical Biodiversity and Environmental Sciences*. **4**(1): 10.

- Punchakara, A., Prajapat, G., Bairwa, H. K., Jain, S., and Agrawal, A. 2023. Applications of Mycosporine-Like Amino Acids Beyond Photoprotection. *Applied and Environmental Microbiology*. **89**(11): 1–16.
- Qurishi, Y., Devanathadesikan, V., Mustafa, M., Benjamin, J., Arun, D., Karrar, M. H., Pushpabai, R., and Mohammed, R. 2021. Anticancer Activity in HeLa and MCF-7 Cells via Apoptotic Cell Death by A Sterol Molecule Cholesta-4, 6-dien-3-ol (EK-7), from The marine Ascidian *Eudistoma kaverium*. *Journal of King Saud University - Science*. **33**(4): 101418.
- Rahayu, W. P., Nurjanah, S., dan Komalasari, E. 2018. *Escherichia coli*: Patogenitas, Analisis, dan Kajian Risiko. IPB Press, Bogor.
- Rammohan, A., Reddy, J. S., Sravya, G., Rao, C. N., and Zyryanov, G. V. 2020. Chalcone Synthesis, Properties and Medicinal Applications: A Review. *Environmental Chemistry Letters*. **18**(2): 433–458.
- Ramsden, J. 2023. Bioinformatics: An Introduction 4th Ed. Springer, Cham.
- Rathahao-Paris, E., Alves, S., Junot, C., and Tabet, J. C. 2016. High Resolution Mass Spectrometry for Structural Identification of Metabolites in Metabolomics. *Metabolomics*. **12**(1): 1–15.
- Rinschen, M. M., Ivanisevic, J., Giera, M., and Siuzdak, G. 2019. Identification of Bioactive Metabolites Using Activity Metabolomics. *Nature Reviews Molecular Cell Biology*. **20**(6): 353–367.
- Rochfort, S. 2005. Metabolomics Reviewed: A New “Omics” Platform Technology for Systems Biology and Implications for Natural Products Research. *Journal of Natural Products*. **68**(12): 1813–1820.
- Rosemary, T., Arulkumar, A., Paramasivam, S., Mondragon-portocarrero, A., and Miranda, J. M. 2019. Biochemical, Micronutrient and Physicochemical Properties of the Dried Red Seaweeds *Gracilaria edulis* and *Gracilaria corticata*. *Molecules*. **24**: 1–14.
- Rossiana, N., Indrawati, I., Rahayuningsih, S., Haifa, I., and Mayawatie, B. 2021. Biodiversity of Macroalgae Endophytic Microorganisms and It’s Potential as An Antibacteria Againts *Escherichia coli* on West Beach Pasir Putih Pangandaran, West Java. *ICONISTECH*. 1–16.
- Rostagno, M. A. and Prado, J. M. 2013. Natural Product Extraction: Principles and Applications. RSC Publishing, Cambridge.
- Sahoo, D. K., Pooja, Jena, S., Mohanty, P., Biswal, H. S., and Gowd, K. H. 2024. Probing The Photostability of Avobenzone with N-acetylcysteine using UV Spectroscopy, Computational Studies and Integration into Aloe Vera Gel. *Journal of Photochemistry and Photobiology A: Chemistry*. **447**: 115196.

- Saleh, B. and Mariri, A. 2017. Archive of SID Antimicrobial Activity of The Marine Algal Extracts Against Selected Pathogens. *JAST*. **19**(1): 1067–1077.
- Sartika, R. dan Purwiyanto, A. I. S. 2013. Aktivitas Antibakteri Ekstrak Rumput Laut *Eucheuma cottoni* terhadap Bakteri *Escherichia coli*, *Staphylococcus aureus*, *Vibrio cholera* dan *Salmonella typhosa*. *Maspuri Journal*. **5**(2): 98–103.
- Saunders, G. W. 2005. Applying DNA Barcoding to Red Macroalgae: A Preliminary Appraisal Holds Promise for Future Applications. *Philosophical Transactions of the Royal Society B: Biological Sciences*. **360**(1462): 1879–1888.
- Saunders, G. W. and Moore, T. E. 2013. Refinements for The Amplification and Sequencing of Red Algal DNA Barcode and RedToL Phylogenetic Markers: A Summary of Current Primers, Profiles and Strategies. *Algae*. **28**(1): 31–43.
- Setyorini, H. dan Puspitasari, A. 2021. Kandungan Protein dan Karbohidrat pada Makroalga di Pantai Sepanjang, Yogyakarta. *Jurnal Ilmu dan Teknologi Kelautan Tropis*. **13**(2): 283–293.
- Shannon, P., Markiel, A., Ozier, O., Baliga, N. S., Wang, J. T., Ramage, D., Amin, N., Schwikowski, B., and Ideker, T. 1971. Cytoscape: A Software Environment for Integrated Models. *Genome Research*. **13**(22): 426.
- Sharma, N., Tyagi, N., and Kumar, S. S. 2017. *Gelidiella acerosa*: A Precis. *International Reserach Journal of Pharmacy*. **8**(4): 20–23.
- Shen, P., Gu, Y., Zhang, C., Sun, C., Qin, L., Yu, C., and Qi, H. 2021. Metabolomic Approach for Characterization of Polyphenolic Compounds in *Laminaria japonica*, *Undaria pinnatifida*, *Sargassum fusiforme* and *Ascophyllum nodosum*. *Foods*. **10**(192): 1–13.
- Siahaan, S., Herman, M. J., and Fitri, N. 2022. Antimicrobial Resistance Situation in Indonesia: A Challenge of Multisector and Global Coordination. *Journal of Tropical Medicine*. **2022**: 10.
- Singh, D. B. and Pathak, R. K. 2022. Bioinformatics: Methods and Applications. Academic Press, London.
- Siregar, A. F., Sabdono, A., dan Pringgenies, D. 2012. Potensi Antibakteri Ekstrak Rumput Laut Terhadap Bakteri Penyakit Kulit *Pseudomonas aeruginosa*, *Staphylococcus epidermidis*, dan *Micrococcus luteus*. *Journal Of Marine Research*. **1**(2): 152–160.
- Sukertiasih, N. K., Megawati, F., Meriyani, H., dan Sanjaya, D. A. 2021. Studi Retrospektif Gambaran Resistensi Bakteri terhadap Antibiotik. *Jurnal Ilmiah Medicamento*. **7**(2): 108–111.
- Suparmi, A. S. 2013. Mengenal Potensi Rumput Laut : Kajian Pemanfaatan Sumber Daya Rumput Laut Dari Aspek Industri dan Kesehatan. *Jurnal*

- Majalah Ilmiah Sultan Agung.* **44**(118): 95–116.
- Talaro, K. p and Chess, B. 2015. Foundation in Microbiology 9th Ed. Mc. Graw-Hill, New York.
- Tamura, K., Stecher, G., and Kumar, S. 2021. MEGA11: Molecular Evolutionary Genetics Analysis version 11. *Molecular Biology and Evolution.* **38**: 3022–3027.
- Tanna, B. and Mishra, A. 2018. Metabolomics of Seaweeds: Tools and Techniques, hal. 37–52, in *Plant Metabolites and Regulation under Environmental Stress.* Elsevier Inc., New York.
- Tassakka, A. C. M. A. R., Sumule, O., Massi, M. N., Sulfahri, Manggau, M., Iskandar, I. W., Alam, J. F., Permana, A. D., and Liao, L. M. 2021. Potential Bioactive Compounds as SARS-CoV-2 Inhibitors from Extracts of The Marine Red Alga *Halymenia durvillei* (Rhodophyta) - A Computational Study. *Arabian Journal of Chemistry.* **14**(11): 103393.
- Tenriulo, A., Suryati, E., Parenrengi, A., dan Rosmiat, R. 2001. Ekstraksi DNA Rumput Laut *Kappaphycus alvarezii* dengan Metode Fenol Kloroform. *Marina Chimica Acta.* **2**(2): 6–10.
- Thiruchelvi, R., Jayashree, P., and Mirunaalini, K. 2021. Synthesis of Silver Nanoparticle Using Marine Red Seaweed *Gelidiella acerosa* -A Complete Study on Its Biological Activity and Its Characterisation. *Materials Today: Proceedings.* **37**: 1693–1698.
- Toy, T. S. S., Lampus, B. S., and Hutagalung, B. S. P. 2015. Uji Daya Hambat Ekstrak Rumput Laut *Gracilaria* sp. Terhadap Pertumbuhan Bakteri *Staphylococcus aureus*. *Jurnal e-GIGI.* **3**(1): 153–159.
- Turupadang, W. and Johanis, M. 2021. Molecular Networking to Screen Macroalgal Secondary Metabolites: Case for West Timor Macroalgae. *Indonesian Journal of Chemical Research.* **9**(2): 129–136.
- Utama, M. S., Sutjihati, S., dan Irpan, A. M. 2022. Keanekaragaman Makroalga di Pantai Drini Yogyakarta. Universitas Pakuan, Bogor.
- Wang, L., Cai, W., Han, B., Zhang, J., Yu, B., and Chen, M. 2021. Ouabain Exhibited Strong Anticancer Effects in Melanoma Cells via Induction of Apoptosis, G2/M Phase Arrest, and Migration Inhibition. *OncoTargets and Therapy.* **14**(1): 1261–1273.
- Wang, X., Yan, S., Wang, Y., Sun, Z., Xia, B., and Wang, G. 2020. Study of The Phylogeny and Distribution of *Pterocladiella* (*Pterocladiaceae*, Rhodophyta) from China. *Phycologia.* **59**(2): 165–176.
- Weckwerth, W. and Morgenthal, K. 2005. Metabolomics: From Pattern Recognition to Biological Interpretation. *Drug Discovery Today.* **10**(22): 1551–

- Wibowo, J. T., Kellermann, M. Y., Versluis, D., Putra, M. Y., Murniasih, T., Mohr, K. I., Wink, J., Engelmann, M., Praditya, D. F., Steinmann, E., and Schupp, P. J. 2019. Biotechnological Potential of Bacteria Isolated from the Sea Cucumber *Holothuria leucospilota* and *Stichopus vastus* from Lampung Indonesia. *Marine Drugs*. **17**(635): 1–25.
- Willey, J. M., Sherwood, L. M., and Woolverton, C. J. 2009. *Prescott's Principles of Microbiology*. McGraw-Hill, New York.
- Wilson, K. and Walker, J. 2010. *Principles and Techniques of Biochemistry and Molecular Biology*. Cambridge University Press, Cambridge.
- Wirawan, I. G. P., Kadek, N., Sintha, E., Malida, M., Sasadara, V., Nengah, I. G., Sunyamurthi, A., Jawi, I. M., Wijaya, I. N., Ayu, I., Darmawati, P., Suada, I. K., and Krisnandika, A. A. K. 2022. Phytochemical Analysis and Molecular Identification of Green Macroalgae *Caulerpa* spp. from Bali, Indonesia. *Molecules*. **27**(4879): 1–13.
- Xiao, Y., Meng, C., Lin, J., Huang, C., Zhang, X., Long, Y., Huang, Y., and Lin, Y. 2017. Ouabain Targets The Na⁺/K⁺-ATPase α3 Isoform to Inhibit Cancer Cell Proliferation and Induce Apoptosis. *Oncology Letters*. **14**(6): 6678–6684.
- Zamora-Quintero, A. Y., Torres-Beltrán, M., Guillén Matus, D. G., Oroz-Parra, I., and Millán-Aguiñaga, N. 2022. Rare Actinobacteria Isolated from The Hypersaline Ojo de Liebre Lagoon as A Source of Novel Bioactive Compounds with Biotechnological Potential. *Microbiology*. **168**(2): 1–16.
- Zhu, Y. Z., Liu, J. W., Wang, X., Jeong, I. H., Ahn, Y. J., and Zhang, C. J. 2018. Anti-BACE1 and Antimicrobial Activities of Steroidal Compounds Isolated from Marine *Urechis unicinctus*. *Marine Drugs*. **16**(3): 1–12.
- Zhu, M., Zhu, Q., Yang, Z., dan Liang, Z. 2021. Clinical Characteristics of Patients with *Micrococcus luteus* Bloodstream Infection in A Chinese Tertiary-Care Hospital. *Polish Journal of Microbiology*. **70**(3): 321–326.
- Zuccarello, G. C. and Paul, N. A. 2019. A Beginner's Guide to Molecular Identification of Seaweed. *Squalen Bulletin of Marine and Fisheries Postharvest and Biotechnology*. **14**(1): 43–53.
- Zwerger, M. J., Hammerle, F., Siewert, B., and Ganzen, M. 2023. Application of Feature-Based Molecular Networking in The Field of Algal Research with Special Focus on Mycosporine-Like Amino Acids. *Journal of Applied Phycology*. **35**(3): 1377–1392.