

DAFTAR PUSTAKA

- Abdelmohsen, U. R., Bayer, K., & Hentschel, U. (2014). Diversity, abundance and natural products of marine sponge-associated actinomycetes. Dalam *Natural Product Reports* (Vol. 31, Nomor 3, hlm. 381–399). <https://doi.org/10.1039/c3np70111e>
- Aguilar, C., Alwali, A., Mair, M., Rodriguez-Orduña, L., Contreras-Peruyero, H., Modi, R., Roberts, C., Sélem-Mojica, N., Licona-Cassani, C., & Parkinson, E. I. (2024). Actinomycetota bioprospecting from ore-forming environments. *Microbial Genomics*, 10(5). <https://doi.org/10.1099/mgen.0.001253>
- Al-Fadhli, A. A., Threadgill, M. D., Mohammed, F., Sibley, P., Al-Ariqi, W., & Parveen, I. (2022). Macrolides from rare actinomycetes: Structures and bioactivities. *International Journal of Antimicrobial Agents*, 59(2), 106523. <https://doi.org/10.1016/j.ijantimicag.2022.106523>
- Antimicrobial resistance: accelerating national and global responses WHO strategic and operational priorities to address drug-resistant bacterial infections in the human health sector, 2025-2035.* (2024). <https://www.who.org/app/uploads/2021/03/en-amr-strategy-2022-final->
- Atikana, A., Ratnakomala, S., Nurzilah, I., Sari, M. N., Agnestania, A., Aisy, I. I., Untari, F., Fahrurrozi, F., Bintang, M., Sukmarini, L., Putra, M. Y., & Lisdiyanti, P. (2021). Uncovering the potential of actinobacterium BLH 1-22 isolated from marine sediment as a producer of antibiotics. *IOP Conference Series: Earth and Environmental Science*, 948(1). <https://doi.org/10.1088/1755-1315/948/1/012056>
- Balagurunathan, R., Radhakrishnan, M., Shanmugasundaram, T., Gopikrishnan, V., & Jerrine, J. (2020). *Protocols in Actinobacterial Research*. Springer US. <https://doi.org/10.1007/978-1-0716-0728-2>
- Barka, E. A., Vatsa, P., Sanchez, L., Gaveau-Vaillant, N., Jacquard, C., Klenk, H.-P., Clément, C., Ouhdouch, Y., & van Wezel, G. P. (2016). Taxonomy, Physiology, and Natural Products of Actinobacteria. *Microbiology and Molecular Biology Reviews*, 80(1), 1–43. <https://doi.org/10.1128/mmbr.00019-15>
- C Reygaert, W. (2018). An overview of the antimicrobial resistance mechanisms of bacteria. *AIMS Microbiology*, 4(3), 482–501. <https://doi.org/10.3934/microbiol.2018.3.482>
- Carrier, T. J., Maldonado, M., Schmittmann, L., Pita, L., Bosch, T. C. G., & Hentschel, U. (2022). Symbiont transmission in marine sponges: reproduction, development, and metamorphosis. Dalam *BMC Biology* (Vol. 20, Nomor 1). BioMed Central Ltd. <https://doi.org/10.1186/s12915-022-01291-6>
- Davies-Bolorunduro, O. F., Osulale, O., Saibu, S., Adeleye, I. A., & Aminah, N. S. (2021). Bioprospecting marine actinomycetes for antileishmanial drugs: current perspectives and future prospects. Dalam *Heliyon* (Vol. 7, Nomor 8). Elsevier Ltd. <https://doi.org/10.1016/j.heliyon.2021.e07710>
- De La Hoz-Romo, M. C., Díaz, L., & Villamil, L. (2022). Marine Actinobacteria a New Source of Antibacterial Metabolites to Treat Acne Vulgaris Disease—A

- Systematic Literature Review. Dalam *Antibiotics* (Vol. 11, Nomor 7). MDPI. <https://doi.org/10.3390/antibiotics11070965>
- Delbari, Y., Mohassel, Y., Kakaei, E., & Bahrami, Y. (2023). Identification and antibacterial property of endophytic actinobacteria from *Thymes kotschyanus*, *Allium hooshidaryae*, and *Cerasus microcarpa*. *Scientific Reports*, 13(1). <https://doi.org/10.1038/s41598-023-40478-x>
- Ereskovsky, A., Borisenko, I. E., Bolshakov, F. V., & Lavrov, A. I. (2021). Whole-body regeneration in sponges: Diversity, fine mechanisms, and future prospects. Dalam *Genes* (Vol. 12, Nomor 4). MDPI AG. <https://doi.org/10.3390/genes12040506>
- Farkas, A., Maróti, G., Kereszt, A., & Kondorosi, É. (2017). Comparative analysis of the bacterial membrane disruption effect of two natural plant antimicrobial peptides. *Frontiers in Microbiology*, 8(JAN). <https://doi.org/10.3389/fmicb.2017.00051>
- Feng, R., Chen, L., & Chen, K. (2018). Fermentation trip: amazing microbes, amazing metabolisms. Dalam *Annals of Microbiology* (Vol. 68, Nomor 11, hlm. 717–729). Springer Verlag. <https://doi.org/10.1007/s13213-018-1384-5>
- Feuda, R., Dohrmann, M., Pett, W., Philippe, H., Rota-Stabelli, O., Lartillot, N., Wörheide, G., & Pisani, D. (2017). Improved Modeling of Compositional Heterogeneity Supports Sponges as Sister to All Other Animals. *Current Biology*, 27(24), 3864–3870.e4. <https://doi.org/10.1016/j.cub.2017.11.008>
- Filipić, B., Ušjak, D., Rambaher, M. H., Oljatic, S., & Milenković, M. T. (2024). Evaluation of novel compounds as anti-bacterial or anti-virulence agents. Dalam *Frontiers in Cellular and Infection Microbiology* (Vol. 14). Frontiers Media SA. <https://doi.org/10.3389/fcimb.2024.1370062>
- Freel, K. C., Edlund, A., & Jensen, P. R. (2012). Microdiversity and evidence for high dispersal rates in the marine actinomycete “*Salinispora pacifica*.” *Environmental Microbiology*, 14(2), 480–493. <https://doi.org/10.1111/j.1462-2920.2011.02641.x>
- Garcia, M., & Cortes, A. (2023). Blue Planet Law: The Ecology of Our Economic and Technological World. *Springer*.
- Green, M. R., & Sambrook, J. (2019). Analysis of DNA by agarose gel electrophoresis. *Cold Spring Harbor Protocols*, 2019(1), 6–15. <https://doi.org/10.1101/pdb.top100388>
- Gubler, H., Schopfer, U., & Jacoby, E. (2013). Theoretical and experimental relationships between percent inhibition and IC50 data observed in high-throughput screening. *Journal of Biomolecular Screening*, 18(1), 1–13. <https://doi.org/10.1177/1087057112455219>
- Gungormusler, M., Gonen, C., & Azbar, N. (2013). Effect of cell immobilization on the production of 1,3-propanediol. *New Biotechnology*, 30(6), 623–628. <https://doi.org/10.1016/j.nbt.2013.02.001>
- Haney, E. F., Trimble, M. J., & Hancock, R. E. W. (2021). Microtiter plate assays to assess antibiofilm activity against bacteria. Dalam *Nature Protocols* (Vol. 16, Nomor 5, hlm. 2615–2632). Nature Research. <https://doi.org/10.1038/s41596-021-00515-3>

- Hanif, N., Murni, A., Tanaka, C., & Tanaka, J. (2019). Marine natural products from Indonesian waters. Dalam *Marine Drugs* (Vol. 17, Nomor 6). MDPI AG. <https://doi.org/10.3390/md17060364>
- Hayakawa, M., & Nonomura, H. (1987). Humic Acid-Vitamin Agar, a New Medium for the Selective Isolation of Soil Actinomycetes. Dalam *J. Ferment. Technol* (Vol. 65, Nomor 5).
- Hentschel, U., Usher, K. M., & Taylor, M. W. (2006). Marine sponges as microbial fermenters. Dalam *FEMS Microbiology Ecology* (Vol. 55, Nomor 2, hlm. 167–177). <https://doi.org/10.1111/j.1574-6941.2005.00046.x>
- Hossain, T. J. (2024). Methods for screening and evaluation of antimicrobial activity: A review of protocols, advantages, and limitations. *European Journal of Microbiology and Immunology*, 14(2), 97–115. <https://doi.org/10.1556/1886.2024.00035>
- Indraningrat, A. A. G., Smidt, H., & Sipkema, D. (2016). Bioprospecting sponge-associated microbes for antimicrobial compounds. Dalam *Marine Drugs* (Vol. 14, Nomor 5). MDPI AG. <https://doi.org/10.3390/md14050087>
- Jagannathan, S. V., Manemann, E. M., Rowe, S. E., Callender, M. C., & Soto, W. (2021). Marine actinomycetes, new sources of biotechnological products. Dalam *Marine Drugs* (Vol. 19, Nomor 7). MDPI. <https://doi.org/10.3390/md19070365>
- Jain, A., Jain, R., & Jain, S. (2020). *Basic Techniques in Biochemistry, Microbiology and Molecular Biology Principles and Techniques*. <https://doi.org/10.1007/978-1-4939-9861-6>
- Jakubiec-Krzesniak, K., Rajnisz-Mateusiak, A., Guspiel, A., Ziemska, J., & Solecka, J. (2018). Secondary metabolites of actinomycetes and their antibacterial, antifungal and antiviral properties. Dalam *Polish Journal of Microbiology* (Vol. 67, Nomor 3, hlm. 259–272). Polish Society of Microbiologists. <https://doi.org/10.21307/pjm-2018-048>
- Johansen, M. D., Herrmann, J. L., & Kremer, L. (2020). Non-tuberculous mycobacteria and the rise of Mycobacterium abscessus. Dalam *Nature Reviews Microbiology* (Vol. 18, Nomor 7, hlm. 392–407). Nature Research. <https://doi.org/10.1038/s41579-020-0331-1>
- Jose, P. A., & Jha, B. (2017). Intertidal marine sediment harbours Actinobacteria with promising bioactive and biosynthetic potential. *Scientific Reports*, 7(1). <https://doi.org/10.1038/s41598-017-09672-6>
- Kopecky, J., Kamenik, Z., Omelka, M., Novotna, J., Stefani, T., & Sagova-Mareckova, M. (2023). Phylogenetically related soil actinomycetes distinguish isolation sites by their metabolic activities. *FEMS Microbiology Ecology*, 99(12). <https://doi.org/10.1093/femsec/fiad139>
- Kumar, R., Biswas, K., Solanki, V., Singh, P., Soalnki, V., Kumar, P., & Tarafdar, A. (2014). Actinomycetes: Potential Bioresource for Human Welfare: A Review. Dalam *RJCES* (Vol. 2). <https://www.researchgate.net/publication/271159657>
- Kumar, V., Ahluwalia, V., Saran, S., Kumar, J., Patel, A. K., & Singhanian, R. R. (2021). Recent developments on solid-state fermentation for production of microbial secondary metabolites: Challenges and solutions. Dalam

- Bioresource Technology* (Vol. 323). Elsevier Ltd.
<https://doi.org/10.1016/j.biortech.2020.124566>
- Kurm, V., Van Der Putten, W. H., & Hol, W. H. G. (2019). Cultivation-success of rare soil bacteria is not influenced by incubation time and growth medium. *PLoS ONE*, 14(1). <https://doi.org/10.1371/journal.pone.0210073>
- Lackner, G., Peters, E. E., Helfrich, E. J. N., & Piel, J. (2017). Insights into the lifestyle of uncultured bacterial natural product factories associated with marine sponges. *Proceedings of the National Academy of Sciences of the United States of America*, 114(3), E347–E356.
<https://doi.org/10.1073/pnas.1616234114>
- Lakhundi, S., & Zhang, K. (2018). Methicillin-Resistant *Staphylococcus aureus*: Molecular Characterization, Evolution, and Epidemiology. Dalam *Clinical microbiology reviews* (Vol. 31, Nomor 4). NLM (Medline).
<https://doi.org/10.1128/CMR.00020-18>
- Limaye, A., Cho, K., Hall, B., Khillan, J. S., & Kulkarni, A. B. (2023). Genotyping Protocols for Genetically Engineered Mice. *Current Protocols*, 3(11).
<https://doi.org/10.1002/cpz1.929>
- Mahdi, R. A., Bahrami, Y., & Kakaei, E. (2022). Identification and antibacterial evaluation of endophytic actinobacteria from *Luffa cylindrica*. *Scientific Reports*, 12(1). <https://doi.org/10.1038/s41598-022-23073-4>
- Messaoudi, O., Benamar, I., Azizi, A., Albukhaty, S., Khane, Y., Sulaiman, G. M., Salem-Bekhit, M. M., Hamdi, K., Ghoummid, S., Zoukel, A., Messahli, I., Kerchich, Y., Benaceur, F., Salem, M. M., & Bendahou, M. (2023). Characterization of Silver Carbonate Nanoparticles Biosynthesized Using Marine Actinobacteria and Exploring of Their Antimicrobial and Antibiofilm Activity. *Marine Drugs*, 21(10). <https://doi.org/10.3390/md21100536>
- Moo, C.-L., Yang, S.-K., Yusoff, K., Ajat, M., Thomas, W., Abushelaibi, A., Lim, S.-H.-E., & Lai, K.-S. (2020). Mechanisms of Antimicrobial Resistance (AMR) and Alternative Approaches to Overcome AMR. *Current Drug Discovery Technology*, 17, 430–447.
<https://doi.org/10.2174/1570163816666190304122219>
- Mossop, J. (2015). Marine Bioprospecting . *Oxford University Press*, 825–842.
- Motohashi, K. (2019). Development of highly sensitive and low-cost DNA agarose gel electrophoresis detection systems, and evaluation of non-mutagenic and loading dye-type DNA-staining reagents. *PLoS ONE*, 14(9).
<https://doi.org/10.1371/journal.pone.0222209>
- Nandina, R. Q., Pujiyanto, S., & Wijanarka, F. (2019). Skrining Aktivitas Antibakteri dan identifikasi Molekuler Berdasarkan Gen 16S rRNA Isolat Aktinomisetes Asal Pulau Enggano dan Bali. *Berkala Bioteknologi*, 2(2).
- Ngamcharungchit, C., Chaimusik, N., Panbangred, W., Euanorasetr, J., & Intra, B. (2023). Bioactive Metabolites from Terrestrial and Marine Actinomycetes. Dalam *Molecules* (Vol. 28, Nomor 15). Multidisciplinary Digital Publishing Institute (MDPI). <https://doi.org/10.3390/molecules28155915>
- Nugraha, A. S., Firli, L. N., Rani, D. M., Hidayatiningsih, A., Lestari, N. D., Wongso, H., Tarman, K., Rahaweman, A. C., Manurung, J., Ariantari, N. P., Papu, A., Putra, M. Y., Pratama, A. N. W., Wessjohann, L. A., & Keller, P. A.

- (2023). Indonesian marine and its medicinal contribution. Dalam *Natural Products and Bioprospecting* (Vol. 13, Nomor 1). Springer. <https://doi.org/10.1007/s13659-023-00403-1>
- Olinger, L. K., McClenaghan, B., Hajibabaei, M., Fahner, N., Berghuis, L., Rajabi, H., Erwin, P., Lane, C. S., & Pawlik, J. R. (2024). Looking for the sponge loop: analyses of detritus on a Caribbean forereef using stable isotope and eDNA metabarcoding techniques. *PeerJ*, 12. <https://doi.org/10.7717/peerj.16970>
- Ossai, J., Khatabi, B., Nybo, S. E., & Kharel, M. K. (2022). Renewed interests in the discovery of bioactive actinomycete metabolites driven by emerging technologies. Dalam *Journal of Applied Microbiology* (Vol. 132, Nomor 1, hlm. 59–77). John Wiley and Sons Inc. <https://doi.org/10.1111/jam.15225>
- Palmer, C. P. (2017). Marine Biodiversity and Ecosystem underpin a healthy planet and social well being. *United Nation*.
- Pita, L., Rix, L., Slaby, B. M., Franke, A., & Hentschel, U. (2018). The sponge holobiont in a changing ocean: from microbes to ecosystems. Dalam *Microbiome* (Vol. 6, Nomor 1, hlm. 46). NLM (Medline). <https://doi.org/10.1186/s40168-018-0428-1>
- Raimundo, I., Silva, S. G., Costa, R., & Keller-Costa, T. (2018). Bioactive secondary metabolites from octocoral-Associated microbes—New chances for blue growth. *Marine Drugs*, 16(12). <https://doi.org/10.3390/md16120485>
- Ratnakomala, S., Sari, N. F., Fahrurrozi, F., & Lisdiyanti, P. (2018). Antimicrobial Activity of Selenium Nanoparticles Synthesized by Actinomycetes Isolated from Lombok Island Soil Samples. *Jurnal Kimia Terapan Indonesia*, 20(1), 8–15. <https://doi.org/10.14203/jkti.v20i1.374>
- Rix, L., Ribes, M., Coma, R., Jahn, M. T., de Goeij, J. M., van Oevelen, D., Escrig, S., Meibom, A., & Hentschel, U. (2020). Heterotrophy in the earliest gut: a single-cell view of heterotrophic carbon and nitrogen assimilation in sponge-microbe symbioses. *ISME Journal*, 14(10), 2554–2567. <https://doi.org/10.1038/s41396-020-0706-3>
- Sarker, S. D., Nahar, L., & Kumarasamy, Y. (2007). Microtitre plate-based antibacterial assay incorporating resazurin as an indicator of cell growth, and its application in the in vitro antibacterial screening of phytochemicals. *Methods*, 42(4), 321–324. <https://doi.org/10.1016/j.ymeth.2007.01.006>
- Selim, M. S. M., Abdelhamid, S. A., & Mohamed, S. S. (2021). Secondary metabolites and biodiversity of actinomycetes. Dalam *Journal of Genetic Engineering and Biotechnology* (Vol. 19, Nomor 1). Springer Science and Business Media Deutschland GmbH. <https://doi.org/10.1186/s43141-021-00156-9>
- Sharma, S. K., Kumar, R., Vaishnav, A., Sharma, P. K., Singh, U. B., & Sharma, A. K. (2017). Microbial cultures: Maintenance, preservation and registration. Dalam *Modern Tools and Techniques to Understand Microbes* (hlm. 335–367). Springer International Publishing. https://doi.org/10.1007/978-3-319-49197-4_22
- Sheehan, J. R., de Wijn, A. S., Freire, T. S., & Friedman, R. (2024). Beyond IC50—A computational dynamic model of drug resistance in enzyme inhibition

- treatment. *PLoS Computational Biology*, 20(11 November).
<https://doi.org/10.1371/journal.pcbi.1012570>
- Sherma, J., & Fried, B. (2003). Handbook of Thin Layer Chromatography . *Marcel Dekker*.
- Silver, J. (2013). Silica gel 60 G and Silica gel 60 GF254 - When and in what cases to use them in TLC. Dalam *researchgate*. researchgate.
- Su, Y., Liu, C., Fang, H., & Zhang, D. (2020). Bacillus subtilis: A universal cell factory for industry, agriculture, biomaterials and medicine. Dalam *Microbial Cell Factories* (Vol. 19, Nomor 1). BioMed Central Ltd.
<https://doi.org/10.1186/s12934-020-01436-8>
- Subramani, R., & Sipkema, D. (2019). Marine rare actinomycetes: A promising source of structurally diverse and unique novel natural products. Dalam *Marine Drugs* (Vol. 17, Nomor 5). MDPI AG.
<https://doi.org/10.3390/md17050249>
- Tang, K. W., Yang, S. C., & Tseng, C. H. (2019). Design, synthesis, and anti-bacterial evaluation of triazolyl-pterostilbene derivatives. *International Journal of Molecular Sciences*, 20(18). <https://doi.org/10.3390/ijms20184564>
- Turner, E. C. (2021). Possible poriferan body fossils in early Neoproterozoic microbial reefs. *Nature*, 596(7870), 87–91. <https://doi.org/10.1038/s41586-021-03773-z>
- Varijakzhan, D., Loh, J. Y., Yap, W. S., Yusoff, K., Seboussi, R., Lim, S. H. E., Lai, K. S., & Chong, C. M. (2021). Bioactive compounds from marine sponges: Fundamentals and applications. Dalam *Marine Drugs* (Vol. 19, Nomor 5). MDPI. <https://doi.org/10.3390/md19050246>
- Varijakzhan, D., Yang, S.-K., Chong, C. M., Akseer, R., Alhosani, M. S., Thomas, W., Lai, K. S., & Lim, S. H. E. (2021). *Essential Oils as Potential Antimicrobial Agents* (hlm. 93–122). https://doi.org/10.1007/978-3-030-58259-3_4
- Wang, C., Du, W., Lu, H., Lan, J., Liang, K., & Cao, S. (2021). A review: Halogenated compounds from marine actinomycetes. Dalam *Molecules* (Vol. 26, Nomor 9). MDPI AG. <https://doi.org/10.3390/molecules26092754>
- Warsito, M. F., Untari, F., Prasetyoputri, A., Rachman, F., Septiana, E., Bayu, A., Atikana, A., Sukmarini, L., & Putra, M. Y. (2022). Antibacterial and Antioxidant Activities of Ginger Essential Oils. *Microbiology Indonesia*, 15(4), 1. <https://doi.org/10.5454/mi.15.4.1>
- Weinstein, M. P., & Lewis, J. S. (2020). The clinical and laboratory standards institute subcommittee on Antimicrobial susceptibility testing: Background, organization, functions, and processes. *Journal of Clinical Microbiology*, 58(3). <https://doi.org/10.1128/JCM.01864-19>
- Wolde, A., Deneke, Y., Sisay, T., & Mathewos, M. (2022). Molecular Characterization and Antimicrobial Resistance of Pathogenic Escherichia coli Strains in Children from Wolaita Sodo, Southern Ethiopia. *Journal of Tropical Medicine*, 2022. <https://doi.org/10.1155/2022/9166209>
- Wood, S. J., Kuzel, T. M., & Shafikhani, S. H. (2023). Pseudomonas aeruginosa: Infections, Animal Modeling, and Therapeutics. Dalam *Cells* (Vol. 12, Nomor 1). MDPI. <https://doi.org/10.3390/cells12010199>

- Yang, Q., Song, Z., Li, X., Hou, Y., Xu, T., & Wu, S. (2023). Lichen-Derived Actinomycetota: Novel Taxa and Bioactive Metabolites. Dalam *International Journal of Molecular Sciences* (Vol. 24, Nomor 8). Multidisciplinary Digital Publishing Institute (MDPI). <https://doi.org/10.3390/ijms24087341>
- Zhang, F., Cui, X., Fu, Y., Zhang, J., Zhou, Y., Sun, Y., Wang, X., Li, Y., Liu, Q., & Chen, T. (2017). Antimicrobial activity and mechanism of the human milk-sourced peptide Casein201. *Biochemical and Biophysical Research Communications*, 485(3), 698–704. <https://doi.org/10.1016/j.bbrc.2017.02.108>
- Zhang, Q. W., Lin, L. G., & Ye, W. C. (2018). Techniques for extraction and isolation of natural products: A comprehensive review. Dalam *Chinese Medicine (United Kingdom)* (Vol. 13, Nomor 1). BioMed Central Ltd. <https://doi.org/10.1186/s13020-018-0177-x>