

DAFTAR PUSTAKA

- Afify, M. G. E., Gomaa, O. M., El Kareem, H. A., & Zeid, M. A. A. (2025). Promoting bacterial colonization and biofilm formation for enhanced biodegradation of low-density polyethylene microplastics. *Bioresources and Bioprocessing*, 12(1): 1-13.
- Ahrendt, C., Perez-Venegas, D. J., Urbina, M., Gonzalez, C., Echeveste, P., Aldana, M., & Galbán-Malagón, C. (2020). Microplastic ingestion cause intestinal lesions in the intertidal fish *Girella laevis*. *Marine Pollution Bulletin*, 151(110795): 1-20.
- Ajith, N., Arumugam, S., Parthasarathy, S., Manupoori, S. & Janakiraman, S. (2020). Global distribution of microplastics and its impact on marine environment—a review. *Environmental Science and Pollution Research*, 27: 25970-25986.
- Alabi, O. A., Ologbonjaye, K. I., Awosolu, O. & Alalade, O. E. (2019). Public and environmental health effects of plastic wastes disposal: a review. *J Toxicol Risk Assess*, 5(2):1-13.
- Ali, S. S., Elsamahy, T., Al-Tohamy, R., Zhu, D., Mahmoud, Y. A. G., Koutra, E., Metwally, A. M., Kornaros, M. & Sun, J. (2021). Plastic wastes biodegradation: Mechanisms, challenges and future prospects. *Science of The Total Environment*, 780: 1-18.
- Apriliya, I., Prasetyo, D. & Selvany, R. (2020). Isolasi Bakteri Rhizosfer Resisten Pestisida dan Herbisida pada Berbagai Jenis Tutupan Lahan. *Agrotekma: Jurnal Agroteknologi dan Ilmu Pertanian*, 5(1): 64-71.
- Austin, H. P., Allen, M. D., Donohoe, B. S., Rorrer, N. A., Kearns, F. L., Silveira, R. L., & Beckham, G. T. (2018). Characterization and engineering of a plastic-degrading aromatic polyesterase. *Proceedings of the National Academy of Sciences*, 115(19): 4350-4357.
- Ayuningtyas, W. C., Yona, D., Julinda, S. H. & Iranawati, F. (2019). Kelimpahan mikroplastik pada perairan di banyuurip, Gresik, Jawa Timur. *JFMR (Journal of Fisheries and Marine Research)*, 3(1): 41-45.

- Azzahra, R, S. (2024). Identifikasi Molekuler dan Uji Kemampuan Bakteri *Bacillus* sp. dalam Mendegradasi Mikroplastik dan Logam Besi (Fe). *Skripsi*. Banda Aceh: Universitas Islam Negeri Ar-Raniry.
- Azizah, P., Ridlo, A. & Suryono, C. A. (2020). Mikroplastik pada Sedimen di Pantai Kartini Kabupaten Jepara Jawa Tengah. *Journal of marine Research*, 9(3): 326-332.
- Azizah, R, N. (2022). Identifikasi bakteri dari sedimen muara sungai progo, d.i. yogyakarta sebagai agen pendegradasi mikroplastik. *Skripsi*. Yogyakarta: Universitas Islam Indonesia Yogyakarta.
- Awasthi, S., Srivastava, P., Singh, P., Tiwary, D., & Mishra, P. K. (2017). Biodegradation of thermally treated high-density polyethylene (HDPE) by *Klebsiella pneumoniae* CH001. *3 Biotech*, 7(5): 332.
- Barrett, J., Chase, Z., Zhang, J., Holl, M. M. B., Willis, K., Williams, A., Hardesty, B. D. & Wilcox, C. (2020). Microplastic pollution in deep-sea sediments from the Great Australian Bight. *Frontiers in Marine Science*, 7: 1-10.
- Bottura, B., Rooney, L. M., Hoskisson, P. A., & McConnell, G. (2022). Intra-colony channel morphology in *Escherichia coli* biofilms is governed by nutrient availability and substrate stiffness. *Biofilm*, 4(100084): 1-9.
- Brenner, D. J., Krieg, N. R., Staley, J. T., & Garrity, G. M. (2005). Family Enterobacteriaceae. In D. J. Brenner, N. R. Krieg, J. T. Staley, & G. M. Garrity (Eds.), *Bergey's manual of systematic bacteriology: Vol. 2. The Proteobacteria, Part B: The Gammaproteobacteria*. New York: Springer.
- Caruajulca-Marin, L., Huamán-Ventura, K., Sánchez-Purihuamán, M., Caro-Castro, J., Barturén-Quispe, A., Vásquez-Llanos, S., & Carreño-Farfán, C. (2025). *Klebsiella pneumoniae* isolated from the intestines of *Tenebrio molitor* larvae (Coleoptera: Tenebrionidae) that consume expanded polystyrene. *Revista Ambiente & Água*, 20 (3037): 1-15.
- Cordova, M. R., Ulumuddin, Y. I., Purbonegoro, T. & Shiomoto, A. (2021). Characterization of microplastics in mangrove sediment of Muara Angke Wildlife Reserve, Indonesia. *Marine Pollution Bulletin*, 163: 1-8.

- De Vos, P., Garrity, G., Jones, D., Krieg, N. R., Ludwig, W., Rainey, F. A., Schleifer, K.-H., & Whitman, W. (Eds.). (2009). *Bergey's manual of systematic bacteriology: Vol. 3. The Firmicutes*. New York: Springer.
- Dewi, N. M. N. B. S. (2022). Studi Literatur Dampak Mikroplastik Terhadap Lingkungan. *Sosial Sains dan Teknologi*, 2(2): 239-250.
- Duan, J., Han, J., Cheung, S. G., Chong, R. K. Y., Lo, C. M., Lee, F. W. F., Xu, S, J, L., Yang, Y., Tam, N, F. & Zhou, H. C. (2021). How mangrove plants affect microplastic distribution in sediments of coastal wetlands: Case study in Shenzhen Bay, South China. *Science of the Total Environment*, 767: 1-10.
- Fang, X., Cai, Z., Wang, X., Liu, Z., Lin, Y., Li, M., & Yan, M. (2024). Isolation and Identification of Four Strains of Bacteria with Potential to Biodegrade Polyethylene and Polypropylene from Mangrove. *Microorganisms*, 12(10): 2005.
- Fauziah, Q., Ramdan, E. P. & Yukti, A. M. (2022). Deteksi bakteri patogen terbawa benih kedelai dengan metode liquid assay. *Jurnal Agronida*, 8(1): 9-15.
- Febriyanti, S. V., Utomo, K. P. & Sulastrri, A. (2024). Analisis Bentuk Mikroplastik pada Sedimen Pantai Mangrove di Kalimantan Barat. *Journal of Marine Research*, 13(2): 231-238.
- García-Depraect, O., Lebrero, R., Rodriguez-Vega, S., Bordel, S., Santos-Beneit, F., Martínez-Mendoza, L. J., Borner Aragao, R., Borner, T., & Munoz, R. (2022). Biodegradation of bioplastics under aerobic and anaerobic aqueous conditions: Kinetics, carbon fate and particle size effect. *Bioresource Technology*, 344(126265): 1-12
- Habib, S., Iruthayam, A., Abd Shukor, M. Y., Alias, S. A., Smykla, J. & Yasid, N. A. (2020). Biodeterioration of untreated polypropylene microplastic particles by Antarctic bacteria. *Polymers*, 12(11): 1-11.
- He, Y., Fang, C., Zeng, Z., Fu, B., Cui, Z., Wang, J., & Yang, H. (2025). Screening and isolation of polyethylene microplastic degrading bacteria from mangrove sediments in southern China. *Science of The Total Environment*, 962(178488): 1-15.

- Hossain, M. T., Shahid, M. A., Mahmud, N., Habib, A., Rana, M. M., Khan, S. A. & Hossain, M. D. (2024). Research and application of polypropylene: a review. *Discover Nano*, 19(2): 1-21.
- Hu, J., Peng, B., Liu, Z., Long, T., Gao, W., Wang, Y., & Zhao, J. (2025). Polyethylene degradation mediated by *Klebsiella variicola* isolated from the gut of insect larvae. *International Biodeterioration & Biodegradation*, 205 (106182).
- Issac, M. N. & Kandasubramanian, B. (2021). Effect of microplastics in water and aquatic systems. *Environmental Science and Pollution Research*, 28: 19544-19562.
- Kang, M. G., Kwak, M. J., & Kim, Y. (2023). Polystyrene microplastics biodegradation by gut bacterial *Enterobacter hormaechei* from mealworms under anaerobic conditions: Anaerobic oxidation and depolymerization. *Journal of hazardous materials*, 459 (132045): 1-17.
- Karapanagioti, H. K. & Kalavrouziotis, I. K. (Eds.). (2019). *Microplastics in water and wastewater*. United Kingdom: Iwa Publishing.
- Khalid, N., Aqeel, M., Noman, A., Khan, S. M. & Akhter, N. (2021). Interactions and effects of microplastics with heavy metals in aquatic and terrestrial environments. *Environmental Pollution*, 290: 1-13.
- Khalid, N., Aqeel, M., Noman, A., Hashem, M., Mostafa, Y. S., Alhaithloul, H. A. S. & Alghanem, S. M. (2021). Linking Effects of Microplastics to Ecological Impacts in Marine Environments. *Chemosphere*, 264 (2): 1-46.
- Khalis, T. A. D., Barus, T. A. & Wahyuningsih, H. (2024). The Abundance of Microplastics in Sediment Siak River Pekanbaru City. *Jurnal Penelitian Pendidikan IPA*, 10(6): 3280-3286.
- Khandare, S. D., Chaudhary, D. R., & Jha, B. (2021). Marine bacterial biodegradation of *low-density polyethylene* (LDPE) plastic. *Biodegradation*, 32(2): 127-143.
- Kim, H. W., Jo, J. H., Kim, Y. B., Le, T. K., Cho, C. W., Yun, C. H., Chi, W. S. & Yeom, S. J. (2021). Biodegradation of polystyrene by bacteria from the soil in common environments. *Journal of Hazardous Materials*, 416: 1-9.

- Kochanowski, J. A., Carroll, B., Asp, M. E., Kaputa, E. C., & Patteson, A. E. (2024). Bacteria colonies modify their shear and compressive mechanical properties in response to different growth substrates. *ACS Applied Bio Materials*, 7(12): 7809-7817.
- Laila, Q. N., Purnomo, P. W. & Jati, O. E. (2020). Kelimpahan Mikroplastik Pada Sedimen Di Desa Mangunharjo, Kecamatan Tugu, Kota Semarang. *Jurnal Pasir Laut*, 4(1): 28-35.
- Liu, F., Rasmussen, L. A., Klemmensen, N. D., Zhao, G., Nielsen, R., Vianello, A., Rist, S. & Vollertsen, J. (2023). Shapes of hyperspectral imaged microplastics. *Environmental Science & Technology*, 57(33): 12431-12441.
- Lv, S., Li, Y., Zhao, S., & Shao, Z. (2024). Biodegradation of typical plastics: from microbial diversity to metabolic mechanisms. *International Journal of Molecular Sciences*, 25(1): 1-25
- Ma, H., Pu, S., Liu, S., Bai, Y., Mandal, S. & Xing, B. (2020). Microplastics in Aquatic Environments: Toxicity to Trigger Ecological Consequences. *Environmental Pollution*, 261: 1-16.
- Mahon, C. R., Lehman, D. C., & Manuselis, G. (2019). *Textbook of Diagnostic Microbiology (6th ed.)*. Missouri: Elsevier
- Makrma, D. B., Suprijanto, J. & Yulianto, B. (2022). Mikroplastik pada Tentakel dan Pencernaan Cumi–Cumi dari TPI Tambak Lorok. *Journal of Marine Research*, 11(3): 467-474.
- Mardalisa., Fatwa, E. B., Yoswaty, D., Feliatra., Effendi, I. & Amin, B. (2021). Isolasi dan Identifikasi Bakteri Indigenous Pendegradasi Plastik dari Perairan Laut Dumai Provinsi Riau. *Jurnal Ilmu Perairan (Aquatic Science)*, 9(1): 77-85.
- Mayanti, L., Rahayu, Y. P., Lubis, M. S. & Yuniarti, R. (2023). Analisis Cemar Bakteri Coliform Pada Saus Jajanan Di Sekitar Sekolah Menengah Kejuruan Di Kota Medan. *Journal of Pharmaceutical and Sciences*, 6 (3): 1282-1289.
- Mierzwa-Hersztek, M., Gondek, K. & Kopeć, M. (2019). Degradation of polyethylene and biocomponent-derived polymer materials: an overview. *Journal of Polymers and the Environment*, 27: 600-611.

- Moniuszko, H., Malonga, W. A. M., Koczoń, P., Thijs, S., Popek, R., & Przybysz, A. (2023). Accumulation of plastics and trace elements in the mangrove forests of Bima City Bay, Indonesia. *Plants*, 12(3), 1-19.
- Novitasari, A. R., Satyantini, W. H., Andriyono, S. & Sa'adah, N. (2023). Isolasi dan Identifikasi Bakteri Pengurai Mikroplastik Polyethylene Terephthalate dari Sedimen Ekosistem Mangrove Pasir Putih. *Journal of Marine Research*, 12(1): 52-60.
- Nugroho, P. & Sena, E. N. K. (2023). Analisa kandungan mikroplastik pada organ ikan konsumsi dari Rawa Pening. *Journal Science of Biodiversity*, 4(1): 16-22.
- Nursyahid, M. B. M., Vanbudi, A., Meilawati, S., Prasetyo, I. A. & Susanti, O. (2022). Agen Pendegradasi Mikroplastik Dari Mikroba Endofit Mangrove *Avicennia marina*. *Journal of Marine Research*, 11(4): 779-784.
- Othman, A. R., Hasan, H. A., Muhamad, M. H., Ismail, N. I. & Abdullah, S. R. S. (2021). Microbial Degradation of Microplastics by Enzymatic Processes: a review. *Environmental Chemistry Letters*, 19: 3057-3073.
- Paray, A. A., Singh, M., Mir, M. A., & Kaur, A. (2023). Gram staining: a brief review. *International Journal of Research and Review*, 10(9): 336-341.
- Ramadhani, I. & Wahyuni. (2020). *Dasar-Dasar Praktikum Mikrobiologi*. Banyumas: CV. Pena Persada.
- Ren, S. Y. & Ni, H. G. (2023). Biodeterioration of Microplastics by Bacteria Isolated from Mangrove Sediment. *Toxics*, 11(5): 432.
- Romdoniah, H. S., Ismail, M. R., & Zallesa, S. (2025). Identification and distribution of microplastics in sediments in the mangrove area of Nusawiru Batukaras Pangandaran. *Acta Aquatica: Aquatic Sciences Journal*, 12(2): 119-127.
- Rosato, A., Romano, A., Totaro, G., Celli, A., Fava, F., Zanaroli, G., & Sisti, L. (2022). Enzymatic Degradation of the Most Common Aliphatic Bio-Polyesters and Evaluation of the Mechanisms Involved: An Extended Study. *Polymers*, 14(9): 2-24.
- Sana, S. S., Dogiparthi, L. K., Gangadhar, L., Chakravorty, A. & Abhishek, N. (2020). Effects of Microplastics and Nanoplastics on Marine Environment

- and Human Health. *Environmental Science and Pollution Research*, 27: 44743-44756.
- Sandra, S. W. & Radityaningrum, A. D. (2021). Kajian kelimpahan mikroplastik di biota perairan. *Jurnal Ilmu Lingkungan*, 19(3): 638-648.
- Sanjana, M., Prajna, R., Katti, U. S. & Kavitha, R. V. (2024). Bioremediation—the recent drift towards a sustainable environment. *Environmental Science: Advances*, 3(8): 1097-1110.
- Sari, D. P., Amir, H. & Elvia, R. (2020). Isolasi Bakteri dari Tanah Tempat Pembuangan Akhir (TPA) Air Sebakul sebagai Agen Biodegradasi Limbah Plastik Polyethylene. *ALOTROP*, 4(2): 98-106.
- Sarker, R. K., Chakraborty, P., Sarkar, S., Ghosh, M. M., & Tribedi, P. (2022). Bioaugmentation of *Enterobacter cloacae* AKS7 Causes an Enhanced Degradation of Low-Density Polyethylene (LDPE) in Soil: A Promising Approach for the Sustainable Management of LDPE Waste. *Archives of Microbiology*, 204(1): 74.
- Skariyachan, S., Patil, A. A., Shankar, A., Manjunath, M., Bachappanavar, N., & Kiran, S. (2018). Enhanced polymer degradation of polyethylene and polypropylene by novel thermophilic consortia of *Brevibacillus* sps. and *Aneurinibacillus* sp. screened from waste management landfills and sewage treatment plants. *Polymer Degradation and Stability*, 149: 52-68.
- Septiana, L., Susanti, E., Haryani, Y., Rani, Z. & Rambe, R. (2024). Penapisan dan Karakterisasi Bakteri Selulolitik Termofilik. *Forte Journal*, 4(2): 472-480.
- Sheppard, C. (2018). Introduction to World Seas: An Environmental Evaluation. *Global Ecology and Biogeography*, 25(6): 729-738.
- Simamora, C. S. L. & Nurdiansyah, S. I. (2020). Identifikasi dan Kepadatan Mikroplastik pada Sedimen di Mempawah Mangrove Park (MMP) Kabupaten Mempawah, Kalimantan Barat. *Jurnal Laut Khatulistiwa*, 2(3): 96-101.
- Susanto, C. A. Z., Fitria, S. N., Purwaningrum, D., Fadila, M. D., Triajie, H. & Chandra, A. B. (2022). Kajian Kelimpahan Mikroplastik Pada Berbagai Tekstur Sedimen di Kawasan Pantai Wisata Mangrove Desa Labuhan. *Juvenil: Jurnal Ilmiah Kelautan dan Perikanan*, 3(4): 143-150.

- Suteja, Y., Atmadipoera, A. S., Riani, E., Nurjaya, I. W., Nugroho, D. & Cordova, M. R. (2021). Spatial and Temporal Distribution of Microplastic in Surface Water of Tropical Estuary: Case Study in Benoa Bay, Bali, Indonesia. *Marine Pollution Bulletin*, 163: 1-14.
- Sousa, A. M., Machado, I., Nicolau, A., & Pereira, M. O. (2013). Improvements on colony morphology identification towards bacterial profiling. *Journal of microbiological methods*, 95(3): 327-335.
- Thomsen, T. B., Schubert, S. W., Hunt, C. J., Westh, P., & Meyer, A. S. (2023). Rate Response of Poly (Ethylene Terephthalate)-Hydrolases to Substrate Crystallinity: Basis for Understanding the Lag Phase. *ChemSusChem*, 16: 1-13.
- Tiwari, N., Santhiya, D., & Sharma, J. G. (2023). Degradation of polyethylene microplastics through microbial action by a soil isolate of *Brevibacillus brevis*. *Polymer Degradation and Stability*, 215 (110436): 1-15.
- Tu, C., Chen, T., Zhou, Q., Liu, Y., Wei, J., Waniek, J. J. & Luo, Y. (2020). Biofilm Formation and Its Influences on the Properties of Microplastics as Affected by Exposure Time and Depth in the Seawater. *Science of the Total Environment*, 734: 1-9.
- Tuhumury, N. & Ritonga, A. (2020). Identifikasi Keberadaan dan Jenis Mikroplastik pada Kerang Darah (*Anadara granosa*) di Perairan Tanjung Tiram, Teluk Ambon. *Triton: Jurnal Manajemen Sumberdaya Perairan*, 16(1): 1-7.
- Umar, H., Husain, F. & Humairah, I. P. (2023). Study of Identification of Microplastic Waste in Sand Sediment at Lambutoa Beach, Takalar Regency. *Maritime Park Journal of Maritime Technology and Society*, 2(2):72-77.
- Vianti, R. O. & Purwiyanto, A. I. (2020). Purifikasi dan Uji Degradasi Bakteri Mikroplastik dari Perairan Muara Sungai Musi, Sumatera Selatan. *Maspari Journal: Marine Science Research*, 12(2): 29-36.
- Wang, C., Zhao, J. & Xing, B. (2021). Environmental Source, Fate, and Toxicity of Microplastics. *Journal of Hazardous Materials*, 407: 1-75.
- Wiratno, E. N., Wardani, E. S., & Agustin, N. (2024). Abundance and Phylogenetic Analysis of High-Density Polyethylene (HDPE) Biodegrading Bacteria from

- Brantas River, Malang City. *Biotropika: Journal of Tropical Biology*, 12(2), 103-109.
- Wong, J. K. H., Lee, K. K., Tang, K. H. D. & Yap, P. S. (2020). Microplastics in the Freshwater and Terrestrial Environments: Prevalence, Fates, Impacts and Sustainable Solutions. *Science of The Total Environment*, 719: 1-15.
- Yang, J., Yang, Y., Wu, W. M., Zhao, J., & Jiang, L. (2014). Evidence of polyethylene biodegradation by bacterial strains from the guts of plastic-eating waxworms. *Environmental science & technology*, 48(23): 13776-13784.
- Yaqin, K., Nirwana, N. & Rahim, S. W. (2022). Konsentrasi Mikroplastik pada Kerang Hijau (*Perna viridis*) di Perairan Mandalle Pangkajene Kepulauan, Sulawesi Selatan. *Jurnal Akuatiklestari*, 5(2): 52-57.
- Yi, X., Chen, Y., Cai, H., Wang, J., Zhang, Y., Zhu, Z. Q., Lin, M., Qin, Y., Jiang, X. L. & Xu, X. (2022). The temperature-dependent expression of type II secretion system controls extracellular product secretion and virulence in mesophilic *Aeromonas salmonida* SRW-OG1. *Frontiers in Cellular and Infection Microbiology*, 12(2), 1–16
- Yuan, J., Ma, J., Sun, Y., Zhou, T., Zhao, Y. & Yu, F. (2020). Microbial Degradation and Other Environmental Aspects of Microplastics/Plastics. *Science of the Total Environment*, 715: 1-9.
- Yuan, Z., Nag, R. & Cummins, E. (2022). Ranking of Potential Hazards from Microplastics Polymers in the Marine Environment. *Journal of Hazardous Materials*, 429: 1-19.
- Yunanto, A., Fitriah, N. & Widagti, N. (2021). Karakteristik Mikroplastik Pada Ekosistem Pesisir Di Kawasan Mangrove Perancak, Bali. *JFMR-Journal of Fisheries and Marine Research*, 5(2): 436-444.
- Zebua, A. H. P., Nursyirwani, N. & Feliatra, F. (2020). Molecular Identification of Proteolytic Bacteria from Mangrove Sediment in Dumai Marine Station. *Asian Journal of Aquatic Sciences*, 3(2): 179-188.
- Zhao, X., Wang, J., Yee Leung, K. M., & Wu, F. (2022). Color: An Important but Overlooked Factor for Plastic Photoaging and Microplastic Formation. *Environmental Science & Technology*, 56(13): 9161-9163.