

DAFTAR PUSTAKA

- Abdoli, S., Asgari Lajayer, B., Bagheri Novair, S., & Price, G. W. (2025). Unlocking the potential of biosurfactants in agriculture: novel applications and future directions. *Sustainability*, 17(5), 2110.
- Abna, I. M., Fauzi, E., & Harizal, H. (2023). Pemanfaatan limbah batang pohon pisang untuk produksi asam laktat secara fermentasi dengan variasi konsentrasi inokulum *Lactobacillus Acidophilus*. *Journal Of Pharmacopolium*, 6(1).
- Adu, S. A., Twigg, M. S., Naughton, P. J., Marchant, R., & Banat, I. M. (2023). Glycolipid biosurfactants in skincare applications: challenges and recommendations for future exploitation. *Molecules*, 28(11), 4463.
- Agustina, R., Sunartati, R., Ermaya, D., & Yulia, R. (2020). Pemanfaatan abu pelepah kelapa sebagai pengawet alami ikan kembung. *Biologica Samudra*, 2(2), 137-144.
- Akbari, S., Abdurahman, N. H., Yunus, R. M., Fayaz, F., & Alara, O. R. (2018). Biosurfactants-a new frontier for social and environmental safety: a mini review. *Biotechnology research and innovation*, 2(1), 81-90.
- Ali, M., Ikbali, M. S., & Jusman. (2022). Determining the surface tension of a liquid and the drop comparison method. *Jurnal Pendidikan Fisika*, 11(1), 143-150. <https://doi.org/10.24252/jpf.v11i1.34113>
- Ali, N., Pang, Z., Wang, F., Xu, B., & El-Seedi, H. R. (2022). Lipopeptide biosurfactants from *Bacillus* spp.: types, production, biological activities, and applications in food. *Journal of Food Quality*, 2022(1), 3930112.
- Alvionita, M., & Hertadi, R. (2021). Pengaruh jenis sumber nitrogen pada produksi biosurfaktan oleh bakteri halofil. *Indonesian Journal of Chemical Analysis (IJCA)*, 4(1), 11-17.
- Azka, S.A. (2024). Produksi biosurfaktan oleh bakteri *Bacillus pumilus* CHN 27 menggunakan variasi sumber nitrogen [skripsi]. Jakarta: Fakultas Matematika dan Ilmu Pengetahuan Alam. Universitas Negeri Jakarta.
- Bello, B., Mustafa, S., Tan, J. S., Ibrahim, T. A. T., Tam, Y. J., Ariff, A. B., Manap, M. Y., & Abbasiliasi, S. (2018). Evaluation of the effect of soluble polysaccharides of palm kernel cake as a potential prebiotic on the growth of probiotics. *3 Biotech*, 8, 1-14.
- Biktasheva, L., Gordeev, A., Kirichenko, A., Kuryntseva, P., & Selivanovskaya, S. (2024). Screening of microorganisms from wastes and identification of the optimal substrate for biosurfactant production. *Microbiology Research*, 15(1), 152-163

- Bjerk, T. R., Severino, P., Jain, S., Marques, C., Silva, A. M., Pashirova, T., & Souto, E. B. (2021). Biosurfactants: properties and applications in drug delivery, biotechnology and ecotoxicology. *Bioengineering*, 8(8), 115.
- Bokau, R. J., & Basuki, T. P. (2018). Bungkil inti sawit sebagai media biokonversi produksi massal larva maggot dan uji respon pemberian pada ikan Nila (*Oreochromis niloticus*). In *Prosiding Seminar Nasional Pengembangan Teknologi Pertanian*.
- Boxley, C. J., Pemberton, J. E., & Maier, R. M. (2015). Rhamnolipids and related biosurfactants for cosmetics. *inform*, 26(4), 207.
- Bzdek, B. R., Reid, J. P., Malila, J., & Prisle, N. L. (2020). The surface tension of surfactant-containing, finite volume droplets. *Proceedings of the National Academy of Sciences*, 117(15), 8335-8343.
- Carolyn, F., Kumar, P. S., & Nguenagni, P. T. (2021). A review on new aspects of lipopeptide biosurfactant: Types, production, properties and its application in the bioremediation process. *Journal of Hazardous Materials*, 407, 124827.
- Chen, X., Lu, Y., Shan, M., Zhao, H., Lu, Z., & Lu, Y. (2022). A mini-review: mechanism of antimicrobial action and application of surfactin. *World Journal of Microbiology and Biotechnology*, 38(8), 143.
- Coban, A., Şimşek, G. K., & Çetin, A. K. (2021). Effect of nitrogen source on growth and protein and lipid amounts of a freshwater microalga *Scenedesmus acutus*. *Turkish Journal of Science and Technology*, 16(2), 215-220.
- Czinkóczy, R., & Németh, Á. (2020). The effect of pH on biosurfactant production by *Bacillus subtilis* DSM10. *Hungarian Journal of Industry and Chemistry*, 37-43.
- Damayana, H., Kiswandono, A. A., Juliasih, N. L. G. R., & Bahri, S. (2024, February). Utilization POME as growth substrate for local indigenous bacteria *Bacillus* sp. ALP D1 in producing biosurfactant. In *IOP Conference Series: Earth and Environmental Science* (Vol. 1312, No. 1, p. 012057). IOP Publishing.
- Debnath, S. (2022). Micelles and reverse micelles: a fascinating micro-reactor. *Modern Approaches in Chemical and Biological Sciences; Lincoln University College, Malaysia*, 17-23.
- Deng, Z., Jiang, Y., Chen, K., Li, J., Zheng, C., Gao, F., & Liu, X. (2020). One biosurfactant-producing bacteria *Achromobacter* sp. A-8 and its potential use in microbial enhanced oil recovery and bioremediation. *Frontiers in microbiology*, 11, 247.
- Dian, N. L., Hamid, R. A., Kanagaratnam, S., Isa, W. R., Hassim, N., Ismail, N., Omar, Z., & Sahri, M. (2017). Palm oil and palm kernel oil: Versatile ingredients for food applications. *Journal of Oil Palm Research*, 29(4), 487-

511.

- Dias, M. A. M., & Nitschke, M. (2023). Bacterial-derived surfactants: an update on general aspects and forthcoming applications. *Brazilian Journal of Microbiology*, 54(1), 103-123.
- Dobrzyński, J., Jakubowska, Z., & Dybek, B. (2022). Potential of *Bacillus pumilus* to directly promote plant growth. *Frontiers in microbiology*, 13, 1069053.
- Duban, M., Cociancich, S., & Leclère, V. (2022). Nonribosomal peptide synthesis definitely working out of the rules. *Microorganisms*, 10(3), 577.
- Dwijayanti, E., Munadi, R., & Farnatubun, M. W. (2023). Analisis proksimat dan kolagen pada kulit ikan tawassang (*Naso thynnoides*). *ILTEK: Jurnal Teknologi*, 18(02), 103-107.
- Dwintarika, A., & Nasution, R. (2024). Analisis kadar air dan kadar lemak pada daging buah durian (*Durio zibhetinus Murr*). *AMINA*, 6(1), 28-33.
- Elazzazy, A. M., Abdelmoneim, T. S., & Almaghrabi, O. A. (2015). Isolation and characterization of biosurfactant production under extreme environmental conditions by alkali-halo-thermophilic bacteria from Saudi Arabia. *Saudi Journal of Biological Sciences*, 22(4), 466-475.
- Faccioli, Y. E. D. S., de Oliveira, K. W., Campos-Guerra, J. M., Converti, A., Soares da Silva, R. D. C. F., & Sarubbo, L. A. (2024). Biosurfactants: chemical properties, ecofriendly environmental applications, and uses in the industrial energy sector. *Energies*, 17(20), 5042.
- Fadhilah, I. N., Octaviani, V., & Kurniasih, N. (2022, March). Nilai nutrisi (analisis proksimat) ampas kelapa terfermentasi sebagai pakan kelinci. In *Gunung Djati Conference Series* (Vol. 7, pp. 83-88).
- Fardami, A. Y., Kawo, A. H., Yahaya, S., Lawal, I., Abubakar, A. S., & Maiyadi, K. A. (2022). A review on biosurfactant properties, production and producing microorganisms. *J Biochem Microbiol Biotechnol*, 10(1), 5-12.
- Fiyani, A., Saridewi, N., & Suryaningsih. (2020). Analisis konsep kimia terkait dengan pembuatan surfaktan dari ampas tebu. *Jurnal Riset Pendidikan Kimia*, 10(2), 94-101. <https://doi.org/10.21009/JRPK.102.05>.
- Gaikwad, S. (2023). Perspective chapter: tapping significance of microbial surfactants as a biopesticide and synthetic pesticide remediator—an ecofriendly approach for maintaining the environmental sustainability. In *Insecticides-Advances in Insect Control and Sustainable Pest Management*. IntechOpen.
- Haeruddin, H., Astuti, W., & Pratiwi, D. R. (2023). Pengaruh ion logam terhadap aktivitas lipase dari bakteri air bekas galian tambang di Samarinda. In *Prosiding Seminar Nasional Kimia 2(1)*, 67-70.

- Hidayat, A. (2019). Pengaruh sumber karbon terhadap produksi biosurfaktan oleh bakteri *Bacillus pumilus* CHN 27 [skripsi]. Jakarta: Fakultas Metmatika dan Ilmu Pengetahuan Alam. Universitas Negeri Jakarta.
- Hisprastin, Y., & Nuwarda, R. (2018). Review: perbedaan emulsi dan mikroemulsi pada minyak nabati. *Farmaka*, 16(1), 133-140.
- Hou, Z., Jiang, W., Wu, X., Gai, J., Zheng, L., Chen, J., ... & Su, L. (2025). Critical Review on the Molecular Behavior of Surfactants at the Oil–Water Interface During Oil Displacement. *Energy Science & Engineering*.
- Jamal, P., Mir, S., Alam, M. Z., & Nawawi, W. M. F. W. (2014). Isolation and selection of new biosurfactant producing bacteria from degraded palm kernel cake under liquid state fermentation. *Journal of Oleo Science*, 63(8), 795-804.
- Jimoh, A. A., & Lin, J. (2019). Enhancement of *Paenibacillus* sp. D9 lipopeptide biosurfactant production through the optimization of medium composition and its application for biodegradation of hydrophobic pollutants. *Applied biochemistry and biotechnology*, 187(3), 724-743.
- Jumini, S. (2015). Pengaruh tegangan permukaan diselat gibraltar berdasarkan surat arrahman ayat 19-20. *Jurnal Penelitian dan Pengabdian Kepada Masyarakat UNSIQ*, 2(2), 106-113.
- Kadhim Dakhil, I. A., & Mahdi, Z. H. (2019). An overview on the recent technologies and advances in drug delivery of poorly water-soluble drugs. *Al Mustansiriyah Journal of Pharmaceutical Sciences*, 19(4), 180-195.
- Kareem, M. K. A., & Mussa, A. H. (2020). A review of biosurfactants (glycolipids): the characteristics, composition and application. *International Journal Psychosoc Rehabil*, 24(05), 3795-807.
- Karlapudi, A. P., Venkateswarulu, T. C., Tammineedi, J., Kanumuri, L., Ravuru, B. K., Ramu Dirisala, V., & Kodali, V. P. (2018). Role of biosurfactants in bioremediation of oil pollution-a review. *Petroleum*, 4(3), 241-249.
- Kong, L., Saar, K. L., Jacquat, R., Hong, L., Levin, A., Gang, H., & Knowles, T. P. (2017). Mechanism of biosurfactant adsorption to oil/water interfaces from millisecond scale tensiometry measurements. *Interface Focus*, 7(6), 20170013.
- Kshash, A. H., & Ismail, A. S. (2019). Minimizing evaporation of light hydrocarbons for iraqi gasoline by using d-glucitol fatty acid esters as reduced pressure agents, synthesis and characterization. *Petroleum & Coal*, 61(1).
- Li, F., Xiong, X. S., Yang, Y. Y., Wang, J. J., Wang, M. M., Tang, J. W., & Gu, B. (2021). Effects of NaCl concentrations on growth patterns, phenotypes associated with virulence, and energy metabolism in *Escherichia coli* BW25113. *Frontiers in microbiology*, 12, 705326.

- Liu, G., McAvoy, G., Hogue, B., & Snodgrass, C. A. (2019). Application of surfactants in commercial crop production for water and nutrient management in sandy soil: HS1230/HS1230, rev. 10/2019. *EDIS*, 2019, 6-6.
- Maia, P. C., Santos, V. P., Fereira, A. S., Luna, M. A., Silva, T. A., Andrade, R. F., & Campos-Takaki, G. M. (2018). An efficient bioemulsifier-producing *Bacillus subtilis* UCP 0146 isolated from mangrove sediments. *Colloids and Interfaces*, 2(4), 58.
- Majid, Z, A., Rahmawati, L., & Rohmanna, N. (2023). Identifikasi profil asam aminio dan lemak *black soldier fly* larve menggunakan pakan bungkil dan sisa makanan. *Jurnal Teknologi Industri Pertanian*, 33(1), 41-49. <https://doi.org/10.24961/j.tek.ind.pert.2023.33.1.41>.
- Mangiwa, S., Abulais, D. M., Patiung, O., & Nisa, Q. A. (2023). Analisis mutu fisik dan kimia serta uji aktivitas antioksidan teh cascara dari kulit kopi arabika (*Coffea arabica* L.). *Jurnal Biologi Papua*, 15(1), 78-87.
- Mani, P., Sivakumar, P., & Balan, S. S. (2016). Economic production and oil recovery efficiency of a lipopeptide biosurfactant from a novel marine bacterium *Bacillus simplex*. *Achievements in the Life Sciences*, 10(1), 102-110.
- Marchut-Mikołajczyk, O., Drożdżyński, P., Polewczyk, A., Smulek, W., & Antczak, T. (2021). Biosurfactant from endophytic *Bacillus pumilus* 2A: physicochemical characterization, production and optimization and potential for plant growth promotion. *Microbial Cell Factories*, 20, 1-11.
- Mardiah, I., Fatimah, I., Setiani, N, A., Hamdani, S., & Astriany, D. (2022). Optimasi produksi biosurfaktan dari bakteri *Bacillus cereus* menggunakan minyak jelantah. *Jurnal Biologi Undayana*, 26(2), 238-247.
- Marlina, N., Bamullo, R. G., Septiani, R., Lusia, M., Paridawati, I., Astuti, D. T., & Hasani, B. (2024). Counseling of how to make organic fertilizer enriched with phosphate solubilizing bacteria to the community in tanjung raja sub-district. *altifani Journal: International Journal of Community Engagement*, 5(1), 86-90.
- Maťátková, O., Michailidu, J., Ježdík, R., Jarošová Kolouchová, I., Řezanka, T., Jirků, V., & Masák, J. (2022). Production and characterization of rhamnolipids produced by *Pseudomonas aeruginosa* DBM 3774: Response surface methodology approach. *Microorganisms*, 10(7), 1272.
- Maulida, E., Jalaluddin, J., ZA, N., Zulnazri, Z., & Kurniawan, E. (2023). Pembuatan surfaktan metil ester sulfonate dari minyak kelapa (virgin coconut oil) dengan metode sulfonasi. *Chemical Engineering Journal Storage (CEJS)*, 3(2), 247. <https://doi.org/10.29103/cejs.v3i2.9969>.
- Md Badrul Hisham, N. H., Ibrahim, M. F., Ramli, N., & Abd-Aziz, S. (2019). Production of biosurfactant produced from used cooking oil by *Bacillus* sp. HIP3 for heavy metals removal. *Molecules*, 24(14), 2617.

- Medhi, M. K., Ambust, S., Kumar, R., & Das, A. J. (2023). Characterization and purification of biosurfactants. In *Advancements in Biosurfactants Research* (pp. 79-93). Cham: Springer International Publishing.
- Miao, Y., To, M. H., Siddiqui, M. A., Wang, H., Lodens, S., Chopra, S. S., & Lin, C. S. K. (2024). Sustainable biosurfactant production from secondary feedstock—recent advances, process optimization and perspectives. *Frontiers in Chemistry*, 12, 1327113.
- Modabber, G., Akhavan Sepahi, A., Yazdian, F., & Rashedi, H. (2023). Evaluation of production of lipopeptide biosurfactants and surfactin micelles by native *Bacillus* of Iran, for a broader application range. *Journal of Surfactants and Detergents*, 26(1), 3-11.
- Ng, Y. J., Khoo, K. S., Chew, K. W., Tang, D. Y. Y., Alharthi, S., Mayol, A. P., & Show, P. L. (2025). Solution towards low yield biosurfactant production from bacteria, a novel approach using microalgae–bacteria consortium. *Microbial Cell Factories*, 24(1), 220.
- Nisah, K., Afkar, M., & Sa'diah, H. (2019). Analisis kadar protein pada tepung jagung, tepung ubi kayu dan tepung labu kuning dengan metode kjedhal. *Amina*, 1(3), 108-113.
- Nour, A. H. (2018). Emulsion types, stability mechanisms and rheology: A review. *International Journal of Innovative Research and Scientific Studies (IJIRSS)*, 1(1).
- Nshimiyimana, P., Liu, L., & Du, G. (2019). Engineering of L-amino acid deaminases for the production of α -keto acids from L-amino acids. *Bioengineered*, 10(1), 43-51.
- Nurfarahin, A. H., Mohamed, M. S., & Phang, L. Y. (2018). Culture medium development for microbial-derived surfactants production—an overview. *Molecules*, 23(5), 1049.
- Pardhi, D. S., Panchal, R. R., Raval, V. H., Joshi, R. G., Poczai, P., Almalki, W. H., & Rajput, K. N. (2022). Microbial surfactants: a journey from fundamentals to recent advances. *Frontiers in microbiology*, 13, 982603.
- Patel, P., Bhatt, S., Patel, H., Sayyed, R. Z., & Aguilar-Marcelino, D. (2022). Biosurfactant a biomolecule and its potential applications. In *Microbial Surfactants* (pp. 63-81). CRC Press.
- Patowary, K., Patowary, R., Kalita, M. C., & Deka, S. (2017). Characterization of biosurfactant produced during degradation of hydrocarbons using crude oil as sole source of carbon. *Frontiers in microbiology*, 8, 279.
- Patowary, R., Rajbongshi, B., Devi, A., Sen, B., Goswami, M., & Sarma, H. (2024). Biosurfactant-enhanced bioremediation of petroleum sludge: unveiling the potential of *Enterobacter cloacae* AR-IASST (01). *Next Sustainability*, 3,

100034.

- Purwasena, I. A., Astuti, D. I., Syukron, M., Amaniyah, M., & Sugai, Y. (2019). Stability test of biosurfactant produced by *Bacillus licheniformis* DS1 using experimental design and its application for MEOR. *Journal of Petroleum Science and Engineering*, 183, 106383.
- Raj, A., Kumar, A., & Dames, J. F. (2021). Tapping the role of microbial biosurfactants in pesticide remediation: an eco-friendly approach for environmental sustainability. *Frontiers in Microbiology*, 12, 791723.
- Rengga, W. D. P., Riyadi, D. H. S., Bintang, A., & Kuntoro, K. (2018, February). Kajian produksi dan proses biosurfaktan rhamnolipida dari limbah industri minyak sawit dan turunannya menggunakan *Pseudomonas aeruginosa*. In *Prosiding Seminar Nasional Energi & Teknologi (SINERGI)* (pp. 84-94).
- Rusli, H., Lestari, S. D., Iqbal, M., & Rusnadi, R. (2023). Komposisi proksimat dari *Gracilia* sp, *Sargassum* sp, dan *Ulva lactuca* di pantai Sayang Heulang, Garut Selatan, Jawa Barat, Indonesia. *Jurnal Kartika Kimia*, 6(2), 116-122.
- Santos, D. K. F., Rufino, R. D., Luna, J. M., Santos, V. A., & Sarubbo, L. A. (2016). Biosurfactants: multifunctional biomolecules of the 21st century. *International journal of molecular sciences*, 17(3), 401.
- Saruni, N. H., Razak, S. A., Habib, S., Ahmad, S. A., Alias, S. A., Johari, W. L. W., & Yasid, N. A. (2019). Comparative screening methods for the detection of biosurfactant-producing capability of Antarctic hydrocarbon-degrading *Pseudomonas* sp. *Journal of Environmental Microbiology and Toxicology*, 7(1), 44-47.
- Sharma, J., Sundar, D., & Srivastava, P. (2021). Biosurfactants: potential agents for controlling cellular communication, motility, and antagonism. *Frontiers in Molecular Biosciences*, 8, 727070.
- Sharma, N., Lavania, M., & Lal, B. (2022). Biosurfactant: a next-generation tool for sustainable remediation of organic pollutants. *Frontiers in Microbiology*, 12, 821531.
- Sharon, M., Modi, F., & Sharon, M. (2016). Titania based nanocomposites as a photocatalyst: A review. *Mater. Sci*, 3(3), 123610-3934.
- Setiani, N. A., Agustina, N., Mardiah, I., Hamdani, S., & Astriany, D. (2016). Potensi *Bacillus cereus* dalam produksi biosurfaktan. *Jurnal Biologi Udayana*, 24(2), 135-141.
- Setyopriatiwi, A., & Hanifah, H. T. U. (2022). Formulasi dan stabilitas mikroemulsi minyak dalam air dengan virgin coconut oil (vco) sebagai fase minyak menggunakan metode emulsifikasi. In *Prosiding Seminar Nasional Kimia* (Vol. 1, pp. 108-123).

- Simões, C. R., da Silva, M. W. P., de Souza, R. F. M., Hacha, R. R., Merma, A. G., Torem, M. L., & Silvas, F. P. C. (2024). Biosurfactants: An overview of their properties, production, and application in mineral flotation. *Resources*, 13(6), 81.
- Souza, E. C., Azevedo, P. O. D. S. D., Domínguez, J. M., Converti, A., & Oliveira, R. P. D. S. (2017). Influence of temperature and pH on the production of biosurfactant, bacteriocin and lactic acid by *Lactococcus lactis* CECT-4434. *CyTA-Journal of Food*, 15(4), 525-530.
- Suganthi, B., & Bharathidasan, R. (2023). Effect of optimization of nutritional requirements and influence of environmental parameters on biosurfactants derived from marine bacteria. *International Journal Pharamaceutical Sciences and rResearch*, 14(6), 3196-3202.
- Sulastri, S., Purnamasari, D. K., & Sumiati, S. (2023). Pemanfaatan kompor listrik rumah tangga sebagai pengganti penangas air pada analisis kadar lemak metode soxhlet. *Jurnal Sains Teknologi & Lingkungan*, 9(1), 105-112.
- Suryani, Y., Hernaman, I., & Ningsih. (2017). Pengaruh penambahan urea dan sulfur pada limbah padat biosetanol yang difermentasi EM-4 terhadap kandungan protein dan serat kasar. *Jurnal Ilmiah Peternakan Terpadu*, 5(1), 13-17.
- Susetyo, R. D., Geraldi, A., Supriyanto, A., Nurhariyat, T., & Nafidiastri, F. A. (2023). Biosurfactant production of entomopathogenic *Bacillus subtilis* BK7. 1, as potential biocontrol bacteria, isolated from Baluran National Park, East Java, Indonesia. *Biodiversitas*, 24(3), 1785-1792.
- Susetyo, R. D., Retnaningrum, E., Wilopo, W., Hadisusanto, S., Salamun, S., Ni'matuzahroh, N. M., & Fatimah, F. (2024). Combination of mollase and glucose as substrate for the production of biosurfactant by *Bacillus subtilis* BK7. 1. In *BIO Web of Conferences* (Vol. 101, p. 02007). EDP Sciences.
- Stainsby, F. M., Hodar, J., & Vaughan, H. (2022). Biosurfactant production by mycolic acid-containing. *Actinobacteria: diversity, applications and medical aspects*, 181.
- Syahriansyah, U. K. M., & Hamzah, A. (2016). Determination of optimum conditions and stability study of biosurfactant produced by *Bacillus subtilis* UKMP-4M5. *Malaysian J. Anal. Sci*, 20(5), 986-1000.
- Syarifain, R. I., Rashaun, M. R., Anggrainy, E. D., & Simarmata, T. (2022). Formulasi pembawa rizobakteri penambat nitrogen dan pelarut fosfat, serta aplikasinya di pembibitan kelapa sawit yang diberi komposisi dan dosis amelioran yang berbeda. *Kultivasi*, 21(2), 190-201.
- Tanwar, B., & Goyal, A. (Eds.). (2021). *Oilseeds: health attributes and food applications*. Singapore: Springer Singapore.

- Th  atre, A., Cano-Prieto, C., Bartolini, M., Laurin, Y., Deleu, M., Niehren, J., ... & Jacques, P. (2021). The surfactin-like lipopeptides from *Bacillus* spp.: Natural biodiversity and synthetic biology for a broader application range. *Frontiers in Bioengineering and Biotechnology*, 9, 623701.
- Tofan, T., & Jasevi  ius, R. (2021). Modelling of the motion and interaction of a droplet of an inkjet printing process with physically treated polymers substrates. *Applied Sciences*, 11(23), 11465.
- Wahjuningrum, D. A., Marhendira, R. A. N., Roelianto, M., Subiyanto, A., Irmaleny, Setiawan, F., Febriyanti, S. E., Setyabudi, Yuanita, T., Patro, S., & Bhardwaj, A. (2021). Osteoinduction ability of human adipose-derived mesenchymal stem cell with chitosan scaffold combination towards blood serum phosphorus levels. *Journal of International Dental and Medical Research*, 14(4), 1386–1393. <https://doi.org/10.20473/jsrte.v5i2.33146>.
- Wahyudi, R., Kasjono, H. S., & Haryanti, S. (2022). Efektivitas penurunan surfaktan pada air limbah cuci tangan menggunakan filtrasi "KELARA". *Ruwa Jurai: Jurnal Kesehatan Lingkungan*, 16(3), 146-151.
- Wahyuningsih, N., & Zulaika, E. (2018). Perbandingan pertumbuhan bakteri selulolitik pada media nutrient broth dan carboxy methyl cellulose. *Jurnal sains dan Seni ITS*, 7(2), 36-38.
- Widiyastuti, D. A., & Salsabilla, N. (2021). Potensi bungkil inti sawit sebagai sampuran media tanam pada tanaman tomat (*Lycopersicum esculentum* Mill). *Jurnal Teknologi Agro-Industri*, 8(1), 1-10.
- Wijaya, H., Thontowi, A., & Yopi. (2017). Optimization production of xylanase by *Bacillus pumilus* in empty fruit bunch using 3 L bioreactor. *Teknologi Indonesia*, 40 (1), 20-30.
- Wu, B., Xiu, J., Yu, L., Huang, L., Yi, L., & Ma, Y. (2022). Biosurfactant production by *Bacillus subtilis* SL and its potential for enhanced oil recovery in low permeability reservoirs. *Scientific Reports*, 12(1), 7785.
- Yulianto, E., Rofingah, J., Finda, A., & Hakim, F. N. (2016). Menentukan tegangan permukaan zat cair. *SPEKTRA: Jurnal Kajian Pendidikan Sains*, 2(2), 176-186.
- Yuliawatin, E. T., Kumalasar, D. P., Trikurniadewi, N., Pratiwi, I. A., Sumarsih, S., & Yuliani, H. (2017). Potency of oil sludge indigenous bacteria from Dumai-Riau in producing biosurfactant on variation of saccharide substrates.
- Zdziennicka, A., Krawczyk, J., Szymczyk, K., & Ja  czuk, B. (2018). Macroscopic and microscopic properties of some surfactants and biosurfactants. *International journal of molecular sciences*, 19(7), 1934.
- Zhang, D., Hua, Z., & Li, Z. (2024). The role of glutamate and glutamine metabolism and related transporters in nerve cells. *CNS neuroscience &*

therapeutics, 30(2), e14617.

Zhong, C., Zhao, J., Chen, W., Wu, D., & Cao, G. (2020). Biodegradation of hydrocarbons by microbial strains in the presence of Ni and Pb. 3 *Biotech*, 10(18), 1-11. <https://doi.org/10.1007/s13205-019-2011-2>.

Zia, K. Z., & Linda, T. M. (2023). Potensi *Bacillus* spp. sebagai penghasil biosurfaktan untuk pengolahan limbah minyak pelumas. *Biota: Jurnal Ilmiah Ilmu-Ilmu Hayati*, 69-78.

Zubaidah, S., Hanim, C., Ariyadi, B., Baskara, A., dan Zuprizal. (2024). nutrient composition and cell-wall structure of palm kernel cake supplemented with enzyme. *Advances in Animal and Veterinary Science*, 12(6), 1191-1198.

