

DAFTAR PUSTAKA

- Ahmed, S., Ahmad, M., Swami, B.L., Ikrarn, S. 2016. A review on plants extract mediated synthesis of silver nanoparticles for antimicrobial applications: a green expertise. *Journal of Advanced Resources*, 7: 17-28.
- Akpan, U.G., Hameed, B.H. 2009. Parameters affecting the photocatalytic degradation of dyes using TiO₂-based photocatalysts: A review. *Journal of Hazardous Materials*, 170 (2-3):520–529.
- Akter, M., Sikder, M.T., Rahman, M.M., Ullah, A., Hossain, K.F.B., Banik, S., Hosokawa, T., Saito, T., Kurasaki, M., 2018. A systematic review on silver nanoparticles-induced cytotoxicity: physicochemical properties and perspectives. *Journal of Advance Resources*, 9: 1–16.
- Albayati, T.M., Sabri, A.A., Alazawi, R.A. 2016. Separation of Methylene Blue as Pollutant of Water by SBA-15 in a Fixed-Bed Column. *Arabian Journal of Science Engineering*, 41: 2409–2415.
- Alhassan, A.M. dan Ahmed, Q.U., 2016. Averrhoa bilimbi Linn: a review of its ethnomedicinal uses, phytochemistry, and pharmacology. *Journal of pharmacy and bioallied sciences*, 8(4):265.
- Ali, A. Ul Haq, I., Akhtar, J., Sher, M., Ahmed, N., Zia, M. 2017. Synthesis of Ag-NPs impregnated cellulose composite material: its possible role in wound healing and photocatalysis. *The Institution of Engineering and Technology*, 11(4): 477 – 484.
- Alves, A.A, Silva, W.E., Belian, M.F., Lins, L.S.G., Galembeck, A. 2020. Bacterial cellulose membranes for environmental water remediation and industrial wastewater treatment. *International Journal of Environmental Science and Technology*, 17: 3997–4008.
- Alonso, E., Faria, M., Mohammadkazemi, F., Resnik, M., Cordeiro, N. 2018. Conductive bacterial cellulose-polyaniline blends: Influence of the matrix and synthesis conditions. *Carbohydrate Polymers*, 183: 254–262.
- Augimeri, RV, Varley, AJ, Strap, JL. 2015. Establishing a role for bacterial cellulose in environmental interactions: lessons learned from diverse biofilm-producing proteobacteria. *Front Microbiology*, 6:1282.
- Aydin YA, dan Aksoy ND. 2014. Isolation and characterization of an efficient bacterial cellulose producer strain in agitated culture: *Gluconacetobacter hansenii* P2A. *Appllied Microbiology Biotechnology*, 98(3):1065–1075.
- Babu, B.R., Parande, A.K., Raghu, S., Kumar, T.P. 2007. Cotton Textile Processing: Waste Generation and Effluent Treatment. *The Journal of Cotton Science*, 11:141–153.
- Barlina, R. dan Palma, B. 2011. Bioselulosa Dari Nata De Coco Sebagai Bahan Baku Edible Film. Kementrian Pertanian, Badan Litbang Pertanian. <https://www.litbang.pertanian.go.id/info-teknologi/1915/file/Bioselulosa-dari-Nata-De-C.pdf>, diakses pada 23 April 2021.
- Barud, H.S., Regiani, T., Marques, R.F.C., Lustri, W.R., Messaddeq, Y., Ribeiro, S.J.L. 2011. Antimicrobial bacterial cellulose-silver nanoparticles composite membranes. *Journal of Nanomaterials*, 721631.

- Barud, H.S., Barrios, C., Regiani, T., Marques, R.F.C., Dexpert-Ghys, J., Messaddeq, Y., Ribeiro, S.J.L., Verelst, M. 2008. Self-supported silver nanoparticles containing bacterial cellulose membranes. *Materials Science and Engineering*, C28: 515–518.
- Beura, R., Pachaiappan, R., Paramasivam, T. 2021. Photocatalytic degradation studies of organic dyes over novel Ag-loaded ZnO-graphene hybrid nanocomposites. *Journal of Physics and Chemistry of Solids*, 148: 109689.
- Birla, S.S., Tiwari, V.V., Gade, A.K., Ingle, A.P., Yadav, A.P., Rai, M. K. 2009. Fabrication of silver nanoparticles by *Phoma glomerata* and its combined effect against *Escherichia coli*, *Pseudomonas aeruginosa* and *Staphylococcus aureus*. *Letter of Applied Microbiology*, 48(2): 173–179.
- Bodea, I.M., Beteg, F.I., Pop, C.R., David, A.P., Dudescu, M.C., Vilău, C., Stănilă, A., Rotar, A.M., Cătușescu, G.M. 2021. Optimization of Moist and Oven-Dried Bacterial Cellulose Production for Functional Properties. *Polymers*, 13: 2088.
- Brett, D. W. 2006. A discussion of silver as an antimicrobial agent: alleviating the confusion. *Ostomy/wound management*, 52: 34–41.
- Britannica, The Editors of Encyclopaedia. methylene blue. *Encyclopedia Britannica*, 28 Sep. 2023, <https://www.britannica.com/science/methylene-blue>. Diakses pada 6 Oktober 2023.
- Broadbent, A.D. 2001. Basic principles of textile coloration, Society of Dyers and Colourists, West Yorkshire, England.
- Brown, A.J. 1988. An Acetic ferment which forms cellulose. *Chemical Society*, 49: 432–439.
- Carpenter, A. W., Lannoy, C.F., Wisner, M.R. 2015. Cellulose nanomaterials in water treatment technologies. *Environmental Science Technology*, 49:5277–5287.
- Castro, C., Zuluaga, R., Putaux, J.L., Caro, G., Mondragon, I., Gañán, P. 2011. Structural Characterization of Bacterial Cellulose Produced by *gluconacetobacter Swingsii* Sp. From Colombian Agroindustrial Wastes. *Carbohydrate Polymers*, 84(1): 96–102.
- Castro, C., Zuluaga, R., Álvarez, C., Putaux, J.-L., Caro, G., Rojas, O., Mondragon, I., Gañán, P. 2012. Bacterial cellulose produced by a new acid-resistant strain of *Gluconacetobacter* genus. *Carbohydrate Polymer*, 89: 1033–1037.
- Chai, Y. D., Pang, Y. L., Lim, S., Chong, W. C., Lai, C. W., Abdullah, A. Z. 2022. Recent progress on tailoring the biomass-derived cellulose hybrid composite photocatalysts. *Polymers*, 14(23): 5244.
- Chand, K., Cao, D., Fouad, D.E., Shah, A.H., Dayo, A.Q., Zhu, K., Lakhan, M.N., Mehdi, G., Dong, S. 2020. Green synthesis, characterization and photocatalytic application of silver nanoparticles synthesized by various plant extracts. *Arabian Journal of Chemistry*, 13(11):1-14.
- Chawla, P.R., Bajaj, I.B., Survase, S.A., Singhal, R.S. 2009. Microbial Cellulose: Fermentative Production and Applications. *Food Technology Biotechnology*, 47(2): 107–124.
- Chen, D., Li, F., Ray, A.K. 2000. Effect of mass transfer and catalyst layer thickness on photocatalytic reaction. *AIChE Journal*, 46(5):1034–1045.

- Chen, H.H., Chen, L.C., Huang, H.C., Lin, S.B. 2011. In situ modification of bacterial cellulose nanostructure by adding CMC during the growth of *Gluconacetobacter xylinus*. *Cellulose*, 18 (6), 1573–1583.
- Chen, M., Kang, H., Gong, Y., Guo, J., Zhang, H., Liu, R. 2015. Bacterial Cellulose Supported Gold Nanoparticles with Excellent Catalytic Properties. *ACS Applied Material Interfaces*, 7(39): 21717–21726.
- Cho, K.-H., Park, J.-E., Osaka, T., Park, S.-G. 2005. The study of antimicrobial activity and preservative effects of nanosilver ingredient. *Electrochimica Acta*, 51: 956–960.
- Chau, T.P., Muthusamy, M., Chinnathambi, A., Alahmadi, T.A., Kuppusamy, S. 2023. Optimization of extraction and quantification of Flavonoids from *Averrhoa bilimbi* fruits using RP-HPLC and its correlation between total flavonoids content against antimicrobial activity. *Applied Nanoscience*, 13:1293–1300.
- Chauhan, A., Verma, R., Kumari, S., Sharma, A., Shandilya, P. 2020. Photocatalytic dye degradation and antimicrobial activities of Pure and Ag-doped ZnO using *Cannabis sativa* leaf extract. *Scientific Reports*, 10: 7881.
- Chequer, F.M.D., de Oliveira, G.A.R., Ferraz, E.R.A., Cardoso, J.C., Zanoni, M.V.B., de Oliveira, D.P., Melih, G. 2013. *Eco-Friendly Textile Dyeing and Finishing*, IntechOpen Limited, London, pp. 151.
- Clasen, C., Sultanova, B., Wilhelms, T., Heisig, P., Kulicke, W.M. 2006. Effects of Different Drying Processes on the Material Properties of Bacterial Cellulose Membranes. *Macromol. Symp.*, 244: 48–58.
- Corzo Salinas, D.R., Sordelli, A., Martínez, L.A., Villoldo, G., Bernal, C., Pérez, M.S. 2021. Production of bacterial cellulose tubes for biomedical applications: Analysis of the effect of fermentation time on selected properties. *International Journal of Biol Macromol*, 189:1–10.
- Dasgupta, J., Silkdar J., Chakraborty S., Curcio S., Drioli E. 2015. Remediation of textile effluents by membrane-based treatment techniques: a state of the art review. *Journal of Environmental Management*, 147:55–72.
- Dhand, V., Soumya, L., Bharadwaj, S., Chakra, S., Bhatt, D., Sreedhar, B. 2016. Green synthesis of silver nanoparticles using *Coffea arabica* seed extract and its antibacterial activity. *Materials Science and Engineering: C*, 58: 36–43.
- Dong, H., Snyder, J.F., Tran, D., Leadore, J. 2013. Hydrogel, aerogel and film of cellulose nanofibrils functionalized with silver nanoparticles. *Carbohydrate Polymer*, 95:760–7.
- Du, Y. dan Rabani J. 2003. The measure of TiO₂ photocatalytic efficiency and the comparison of different photocatalytic titania. *Journal of physical Chemistry B*, 107:11970–11978.
- Duan, H., Wang, D., Li, Y. 2015. Green chemistry for nanoparticle synthesis. *Chem Soc Rev*, 44:5778–5792.
- Elayaraja, S., Zagorsek, K., Li, F., Xiang, J. 2017. In situ synthesis of silver nanoparticles into TEMPO-mediated oxidized bacterial cellulose and their antivibriocidal activity against shrimp pathogens. *Carbohydrate Polymers*, 166:329–37.

- El-Saied, H., Basta, A.H., Gobran, R.H. 2004. Research Progress in Friendly Environmental Technology for the Production of Cellulose Products (Bacterial Cellulose and Its Application). *Polymer-Plastics Technology and Engineering* 43(3), 797–820.
- Escárcega-González, C.E., Garza-Cervantes, J.A., Vázquez-Rodríguez, A., Morones-Ramírez, J.R. 2018. Bacterial Exopolysaccharides as Reducing and/or Stabilizing Agents during Synthesis of Metal Nanoparticles with Biomedical Applications. *Hindawi, International Journal of Polymer Science*, Volume 2018, Article ID 7045852.
- Esmaceli, N., Mohammadi, P., Abbaszadeh, M., Sheibani, H. 2019. Au nanoparticles decorated on magnetic nanocomposite (GO-Fe₃O₄/Dop/Au) as a recoverable catalyst for degradation of methylene blue and methyl orange in water. *International Journal of Hydrogen Energy*, 7:25.
- Eswaramoorthi, S, Dhanapal, K, Chauhan, D. 2008. Advanced in Textile Waste Water Treatment: The Case for UV-Ozonation and Membrane Bioreactor for Common Effluent Treatment Plants in Tirupur, Tamil Nadu, India. *Environment with People's Involvement & Co-ordination in India*. Coimbatore, India.
- Fatimah, I., Indriani, N. 2018. Silver nanoparticles synthesized using lantana camara flower extract by reflux, microwave and ultrasound methods. *Chem. J. Moldova*, 13: 95–102.
- Feng, J., Shi, Q., Li, W., Shu, X., Chen, A., Xie, X. 2014. Antimicrobial activity of silver nanoparticles in situ growth on TEMPO mediated oxidized bacterial cellulose. *Cellulose*, 21:4557–67.
- Festucci-Buselli, R.A., Otoni, W.C., Joshi, C.P., 2007. Structure, Organization, and Functions of Cellulose Synthase Complexes in Higher Plants. *Brazilian Journal of Plant Physiology*, 19(1).
- Frone, D.M. Panaitescu, C.A. Nicolae, et al., 2020. Bacterial cellulose sponges obtained with green cross-linkers for tissue engineering, *Materials Science & Engineering C*, 110740.
- Galdino, C.J.S., Maia, A.D., Meira, H.M., Souza, T.C., Amorim, J.D.P., Almeida, F.C.G., Costa, A.F.S., Sarubbo, L.A. 2019. Use of a bacterial cellulose filter for the removal of oil from wastewater. *Process Biochemistry*, 91: 288-296.
- Gaminian, H., Montazer, M. 2017. Decorating silver nanoparticles on electrospun cellulose nanofibers through a facile method by dopamine and ultraviolet irradiation. *Cellulose*, 24:3179–3190.
- Gao, R., Stark, J., Bahnemann, D.W. 2002. Quantum yields of hydroxyl radicals in illuminated TiO₂ nanocrystallite layers. *J Photochem Photobiol A*, 148:387–391.
- Gayathry, G., Gopalaswamy, G., 2014. Production and Characterization of Microbial Cellulosic Fibre From *Acetobacter Xylinum*. *Indian Journal of Fibre and Textile Research*, 39: 93-96.
- Ghaly, AE, Ananthashankar, R., Alhattab, M., Ramakrishnan, V.V. 2014. Production, Characterization and Treatment of Textile Effluents: A Critical Review. *Journal of Chemical Engineering & Process Technology*, 5(1): 1000182.

- Gomes, F.P., Silva, N.H., Trovatti, E., Serafim, L.S., Duarte, M.F., Silvestre, A.J. 2013. Production of bacterial cellulose by *Gluconacetobacter sacchari* using dry olive mill residue. *Biomass Bioenergy*, 55:205–11.
- Gomes, J. F., Garcia, A. C., Ferreira, E. B., Pires, C., Oliveira, V.L., Tremiliosi-Filho, G., Gasparotto, L. H. S. 2015. New insights into the formation mechanism of Ag, Au and AgAu nanoparticles in aqueous alkaline media: alkoxides from alcohols, aldehydes and ketones as universal reducing agents. *Physical Chemistry Chemical Physics*, 17, 2168321693.
- Granström, M. 2009. *Cellulose Derivatives: Synthesis, Properties and Applications*. Academic Dissertation, Department of Chemistry, University of Helsinki, Finland.
- Gupta, V.K., Suhas. 2009. Application of low-cost adsorbents for dye removal—A review, *Journal of Environmental Management*, 90: 2313–2342.
- Gupta, V.K., Agarwal, S., Pathania, D., Kothiyal, N.C. and Sharma, G. 2013. Use of pectin/thorium (IV) tungstomolybdate nanocomposite for photocatalytic degradation of methylene blue. *Carbohydrate polymers*, 96(1): 277–283.
- Hamed, S., Shojaosadati, S.A., Mohammad, A. 2017. Evaluation of the catalytic, antibacterial and anti-biofilm activities of the *Convolvulus arvensis* extract functionalized silver nanoparticles. *Journal of Photochemistry & Photobiology, B: Biology*, 167: 36–44.
- Han, T.H., Khan, M.M., Kalathil, S., Lee, J., Cho, M.H. 2013. Simultaneous Enhancement of Methylene Blue Degradation and Power Generation in a Microbial Fuel Cell by Gold Nanoparticles. *Industrial & Engineering Chemistry Research*, 52(24): 8174–8181
- Han, Y., Wu, X., Zhang, X., Zhou, Z., Lu, C. 2016. Reductant-Free Synthesis of Silver Nanoparticles-Doped Cellulose Microgels for Catalyzing and Product Separation. *ACS Sustainable Chem. Eng.*, 4: 6322–6331.
- Hasanuzzaman, M., Ali, M.R., Hossain, M., Kuri, S., Islam, M.S. 2013. Evaluation of total phenolic content, free radical scavenging activity and phytochemical screening of different extracts of *Averrhoa bilimbi* (fruits). *Int Curr Pharm J* 2(4):92–96.
- He, F., Yang, H., Zeng, L., Hu, H., Hu, C. 2020. Production and characterization of bacterial cellulose obtained by *Gluconacetobacter xylinus* utilizing the by-products from Baijiu production. *Bioprocess Biosyst Eng.*, 43: 936.
- Hervés, P., Pérez-Lorenzo, M., Liz-Marzán, L. M., Dzubiella, J., Lu, Y., Ballauff, M. 2012. Catalysis by metallic nanoparticles in aqueous solution: model reactions. *Chem. Soc. Rev.*, 41: 5577.
- Hillenkamp, M., Di Domenicantonio, G., Eugster, O., Félix, C. 2006. Instability of Ag nanoparticles in SiO₂ at ambient conditions. *Nanotechnology*, 18:015702.
- Hornung, M., Ludwig, M., Gerrard, A.M., Schmauder, H.P. 2006. Optimizing the Production of Bacterial Cellulose in Surface Culture: Evaluation of Substrate Mass Transfer Influences on the Bioreaction (Part 1). *Engineer Life Science*, 6, 537–545..
- Horue, M., Cacicedo, M.L., Fernandez, M.A., Rodenak-Kladniew, B., Torres Sánchez, R.M., Castro, G.R. 2020. Antimicrobial activities of bacterial

- cellulose – Silver montmorillonite nanocomposites for wound healing. *Mater Sci Eng C*, 116:111152.
- Houas, A., Lachheb, H., Ksibi, M., Elaloui, E., Guillard, C. and Herrmann, J.M. 2001. Photocatalytic degradation pathway of methylene blue in water. *Applied Catalysis B: Environmental*, 31(2): 145-157.
- Huang, C., Ji, H., Yang, Y., Guo, B., Luo, L., Meng, X., Xu, J. 2020. TEMPO-oxidized bacterial cellulose nanofiber membranes as highperformance separators for lithium-ion batteries. *Carbohydrate Polymers*, 230: 115570.
- Hussain, Z., Sajjad, W., Khan, T., Wahid, F. 2019. Production of bacterial cellulose from industrial wastes: a review. *Cellulose*, 26:2895–2911.
- Iguchi, M., Yamanaka, S., dan Budhiono, A. 2000. Bacterial cellulose—A masterpiece of nature's arts. *Journal of Materials Science*, 35(2): 261–270.
- Imai, O., Putaux, J.L., Sugiyama, J. 2003. Geometric phase analysis of lattice images from algal cellulose microfibrils. *Polymer*, 44: 1871–1879.
- Isik, Z., Unyayar, A., Dizge, N. 2018. Filtration and Antibacterial Properties of Bacterial Cellulose Membranes for Textile Wastewater Treatment. *Avicenna J Environ Health Eng.*, 5 (2): 106-114.
- Jadoun, S., Arif, R., Jangid, N.K., Meena, R.K. 2020. Green synthesis of nanoparticles using plant extracts: a review. *Environmental Chemistry Letters*, 19: 355–374.
- Jiang, X., Xie, Y., Lu, J., Zhu, L., He, W., Qian, Y. 2001. Preparation, characterization, and catalytic effect of CS2-stabilized silver nanoparticles in aqueous solution. *Science*, D21:3795–9.
- Jie, X., Cao, Y., Qin, J.J., Liu, J., Yuan, Q. 2005. Influence of drying method on morphology and properties of asymmetric cellulose hollow fibre membrane. *Journal of Membrane Science*, 246(2): 157-165.
- Jung, W. K. 2008. Antibacterial activity and mechanism of action of the silver ion in *Staphylococcus aureus* and *Escherichia coli*. *Appl. Environ. Microbiol.*, 74: 2171–2178
- Jung, H.I., Lee, O.M., Jeong, J.H., Jeon, Y.D., Park, K.H., Kim, H.S. 2010. Production and characterization of cellulose by *acetobacter* sp V6 using a cost-effective molasses-corn steep liquor medium. *Applied Biochemistry and Biotechnology*, 162: 486–497.
- Kaczmarek, M., Jedrzejczak-Krzepkowska, M., Ludwicka, K. 2022. Comparative Analysis of Bacterial Cellulose Membranes Synthesized by Chosen *Komagataeibacter* Strains and Their Application Potential. *International Journal of Molecular Sciences*, 23: 3391.
- Kadam, J., Dhawal, P., Barve, S., Kakodkar, S. 2020. Green synthesis of silver nanoparticles using cauliflower waste and their multifaceted applications in photocatalytic degradation of methylene blue dye and Hg^{2+} biosensing. *SN Applied Sciences*, 2:738.
- Kahlert, H., Meyer, G., Albrecht, A. 2016. Colour maps of acid–base titrations with colour indicators: how to choose the appropriate indicator and how to estimate the systematic titration errors. *ChemTexts*, 2: 7.
- Kaitheri, A., Kunjalukkal Padmanabhan, S., Pal, S., Stoppa, M., Licciulli, A. 2023. Silver phosphate–bacterial cellulose nanocomposites as visible light

- photocatalyst for wastewater purification. *Carbohydrate Polymer Technologies and Applications*, 6: 100365.
- Kazemi, F., Mohamadnia, Z., Kaboudin, B., Karimi, Z. 2016. Photodegradation of methylene blue with a titanium dioxide/polyacrylamide photocatalyst under sunlight. *Journal of Applied Polymer Science*, 133: 43386.
- Khan, I., Saeed, K., Zekker, I., Zhang, B., Hendi, A.H., Ahmad, A., Ahmad, S., Zada, N., Ahmad, H., Shah, L.A. 2022. Review on Methylene Blue: Its Properties, Uses, Toxicity and Photodegradation. *Water*, 14: 242.
- Khoo, H.E., Azlan, A., Kong, K.W., Ismail, A. 2016. Phytochemicals and Medicinal Properties of Indigenous Tropical Fruits with Potential for Commercial Development. *Evidence-Based Complementary and Alternative Medicine*, Volume 2016, Article ID 7591951.
- Kirk dan Othmer, 1998, *Encyclopedia of chemical technology* fourth edition, vol 19. Wiley, New York
- Klemm, D., Heublein, B., Fink, H.P., Bohn, A. 2005. Cellulose: Fascinating Biopolymer and Sustainable Raw Material. *Angewandte Chemie – International Edition*, 44(22), 3358–3393.
- Koutinas, AA., Vlysidis, A., Pleissner, D., Kopsahelis, N., Garcial, L., Kookos, LK, Papanikolaou, S., Kwan, TH, Lin, CSK. 2014. Valorization of industrial waste and by-product streams via fermentation for the production of chemicals and biopolymers. *Chemical Society Reviews*, 43:2587–2627.
- Krystynowicz, A., Czaja, W., Wiktorowska-Jeziarska, A., Gonçalves-Miśkiewicz, M., Turkiewicz, M., & Bielecki, S. 2002. Factors affecting the yield and properties of bacterial cellulose. *Journal of Industrial Microbiology & Biotechnology*, 29 (4), 189–195.
- Kuang, Y., Zhang, X., Zhou, S. 2020. Adsorption of Methylene Blue in Water onto Activated Carbon by Surfactant Modification. *Water*, 12: 587.
- Kumbhar, JV, Rajwade, JM, Paknikar, KM. 2015. Fruit peels support higher yield and superior quality bacterial cellulose production. *Applied Microbiology Biotechnology*, 99(16):6677–6691.
- Lateef, A., Ojo, S.A., Elegbede, J.A. 2016. The emerging roles of arthropods and their metabolites in the green synthesis of metallic nanoparticles. *Nanotechnology Review*, 5:601–622.
- Lehtonen, J., Chen, X., Beaumont, M., Hassinen, J., Orelma, H., Dum, L.F., Tardy, B.L., Rojas, O.J. 2021. Impact of incubation conditions and post-treatment on the properties of bacterial cellulose membranes for pressure-driven filtration. *Carbohydrate Polymers* 251, 117073
- Leonarski, E., Cesca, K., Zanella, E., Stambuk, B.U., de Oliveira, D., Poletto, P. 2020. Production of kombucha-like beverage and bacterial cellulose by acerola byproduct as raw material. *Lwt.*, 135:1–8.
- Li, Q., Liu, F., Li, M., Chen, C., Gadd, G.M. 2022. Nanoparticle and nanomineral production by fungi. *Fung Biol Rev.*, 41:31-44.
- Li, Z., Wang, L., Chen, S., Feng, C., Chen, S., Yin, N., Yang, J., Wang, H., Xu, Y. 2014. Facile green synthesis of silver nanoparticles into bacterial cellulose. *Cellulose*, 22: 373–383.

- Lima, V.L.A.G., Melo, E., Lima, L.D.S. 2001. Physicochemical characteristics of bilimbi (*Averrhoa bilimbi*). *Revista Brasileira de Fruticultura*, 23(2).
- Liu, D., Liu, J., Lin, S., Wei, X., Guo, M.J. 2019. Preparation and characterization of cellulose nanocrystals with different aspect ratios as nano-composite membrane for cationic dye removal. *SN Applied Sciences*, 1:1596.
- Liu, M, Liu, L, Jia, S. 2018. Complete genome analysis of *Gluconacetobacter xylinus* CGMCC 2955 for elucidating bacterial cellulose biosynthesis and metabolic regulation. *Sci Rep*.8(1):6266.
- Luo, H., Zhang, J., Xiong, G., Wan, Y. 2014. Evolution of morphology of bacterial cellulose scaffolds during early culture. *Carbohydrate Polymers*, 111: 722–728.
- Lynd, L.R., Weimer, P.J., Van Zyl, W.H., Pretorius, I.S. 2002. Microbial cellulose utilization: fundamentals and biotechnology. *Microbiology and molecular biology reviews*, 66(3): 506-77.
- Makeswari, M., Saraswathi, P. 2020. Photo catalytic degradation of methylene blue and methyl orange from aqueous solution using solar light onto chitosan bi-metal oxide composite. *SN Applied Science*, 2: 336.
- Mandal, D., Bolander, M.E., Mukhopadhyay, D., Sarkar, G., Mukherjee, P. 2006. The use of microorganisms for the formation of metal nanoparticles and their application. *Applied Microbiology Biotechnology*, 69: 485-492.
- Mondal, S., Reyes, M.E.A., Pal, U., 2017. Plasmon induced enhanced photocatalytic activity of gold loaded hydroxyapatite nanoparticles for methylene blue degradation under visible light. *RSC Advances*, 7: 863.
- Maneerung, T., Tokura, S., Rujiravanit, R. 2008. Impregnation of silver nanoparticles into bacterial cellulose for antimicrobial wound dressing. *Carbohydrate Polymers*, 72(1): 43-51.
- Marimuthu, S., Antonisamy, A.J., Malayandi, S., Rajendran, K., Tsai, P.C., Pugazhendhi, A., Ponnusamy, V.K. 2020. Silver nanoparticles in dye effluent treatment: A review on synthesis, treatment methods, mechanisms, photocatalytic degradation, toxic effects and mitigation of toxicity. *Journal of Photochemistry & Photobiology, B: Biology*, 111823.
- Miean, K.H., Mohamed, S. 2001. Flavonoid (myricetin, quercetin, kaempferol, luteolin, and apigenin) content of edible tropical plants. *Journal of Agriculture Food Chemistry*, 49(6):3106–3112.
- Mondal, S., De Anda Reyes, M.E., Pal, U. 2017. Plasmon induced enhanced photocatalytic activity of gold loaded hydroxyapatite nanoparticles for methylene blue degradation under visible light. *RSC Advances*, 7: 8633–8645.
- Mohamed, R.M., D.L., McKinney, Sigmund, W.M. 2012. Enhanced nanocatalysts. *Materials Science and Engineering: R: Reports*, 73: 1–13.
- Moniri M, Boroumand Moghaddam A, Azizi S. 2017. Production and status of bacterial cellulose in biomedical engineering. *Nanomaterials (Basel)*, 7(9):257.

- Moon, R.J., Martini, A., Nairn, J., Simonsen, J., Youngblood, J. 2011. Cellulose nanomaterials review: structure, properties and nanocomposites. *Chemical Society Reviews*, 40: 3941–3994.
- Morones, JR, Elechiguerra, JL, Camacho, A, Holt, K, Kouri, JB, Ramirez, JT. 2005. The bactericidal effect of silver nanoparticles. *Nanotechnology*, 16(10):2346-53.
- Moustafa, S. 2008. *Process Analysis & Environmental Impacts of Textile Manufacturing. Dyes and Chemicals*
- Muthulakshmi, L., Rajini, N., Rajalu, A.V., Siengchin, S., Kathiresan, T. 2017. Synthesis and Characterization of Cellulose/Silver Nanocomposites from Biofloculant Reducing Agent. *International Journal of Biological Macromolecules*, 103: 1113-1120.
- Mutiara, T., Sulisty, H., Fahrurrozi, M., Hidayat, M. 2022. Facile route of synthesis of silver nanoparticles templated bacterial cellulose, characterization, and its antibacterial application. *Green Processing and Synthesis*, 11: 361–372.
- Nese, T, Sivri, N, Toroz, I. 2007. Pollutants of Textile Industry Wastewater and Assessment of its Discharge Limits by Water Quality Standards. *Turkish J Fisheries Aquatic Sciences*, 7: 97-103.
- Nur, A. dan Fajar, D.R. 2019. Identifikasi Senyawa Kimia pada Ekstrak Etanol 70% Buah Belimbing Wuluh (*Averrhoa bilimbi* L.). *Kieraha Medical Journal*, Volume 1. No.1, e-ISSN: 2686-5912
- Orwa dkk. 2009. *Averrhoa bilimbi*. *Agroforestry Database 4.0*, http://apps.worldagroforestry.org/treedb2/AFTPDFS/Averrhoa_bilimbi.PDF (diakses pada 16 Maret 2023)
- Pa'e, N., Hamid, N.I.A., Khairuddin, N., Zahan, K.A., Seng, K.F., Siddique, B.M., Muhamad, I.I. 2014. Effect of Different Drying Methods on the Morphology, Crystallinity, Swelling Ability and Tensile Properties of Nata De Coco. *Sains Malaysiana*, 43(5): 767–773.
- Park, S., Baker, J.O., Himmel, M.E., Parilla, P.A., Johnson, D.K. 2010. Cellulose crystallinity index: measurement techniques and their impact on interpreting cellulase performance. *Biotechnology for Biofuels*, 3:10.
- Parte, F.G.B., Santoso, S.P., Chou, C.C., Verma, V., Wang, H.T., Ismadji, S., Cheng, K.C. 2020. Current progress on the production, modification, and applications of bacterial cellulose. *Critical Reviews in Biotechnology*, 40(3): 397-414.
- Patil, A.G., Koli, S.P., Patil, D.A. 2013. Pharmacognostical standardization and HPTLC ingerprint of *Averrhoa bilimbi* (L.) fruits. *J Pharm Res* 6(1):145–150
- Pino, J.A., Marbot, R., Bello, A. 2004. Volatile Components of *Averrhoa bilimbi* L. Fruit Grown in Cuba. *Journal of Essential Oil Research*, 16(3): 241-242.
- Quattrocchi, U. 1999. *CRC World Dictionary of Plant Names: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology*. Vol. 3. New York, USA: CRC Press
- Quiroz Castañeda, R. dan Folch-Mallol, J. 2013. Hydrolysis of Biomass Mediated by Cellulases for the Production of Sugars. *Degradation of Lignocellulosic Biomass - Techniques, Applications and Commercialization Sustainable*

- Degradation of Lignocellulosic Biomass - Techniques, Applications and Commercialization, chapter 6, page 120, InTech Publisher
- Rangaswamy, BE, Vanitha, KP, Hungund, BS. 2015. Microbial cellulose production from bacteria isolated from rotten fruit. *International Journal of Polymer Science*, 280784:1–8.
- Rani, M.-U. dan Appaiah, A. 2011. Optimization of culture conditions for bacterial cellulose production from *gluconacetobacter hansenii* UAC09. *Annals of Microbiology*, 61: 781–787.
- Rashad, M., Shaalan, N.M., Abd-Elnaem, A.M. 2016. Degradation enhancement of methylene blue on ZnO nanocombs synthesized by thermal evaporation technique. *Desalination and Water Treatment*, 57:54, 26267-26273.
- Ravichandran, V., Vasanthi, S., Shalini, S., Shah, S.A.A., Tripathy, M., Paliwal, N. 2019. Green synthesis, characterization, antibacterial, antioxidant and photocatalytic activity of *Parkia speciosa* leaves extract mediated silver nanoparticles. *Results in Physics*, 15: 102565.
- Renuka, R., Devi, K.R., Sivakami, M., Thilagavathi, T., Uthrakumar, R., Kaviyarasu, K. 2020. Biosynthesis of silver nanoparticles using *Phyllanthus emblica* fruit extract for antimicrobial application. *Biocatalysis and Agricultural Biotechnology*, 24:101567.
- Ross, P., Mayer, R., Benziman, M. 1991. Cellulose Biosynthesis and Function in Bacteria. *Microbiological reviews*, 55(1): 35-58.
- Rothon, R., 2012, Pigment and nanopigment dispersion technologies, Smithers Rapra Publishing.
- Ruzicka, O. dan L. Safira. 2014. Aplikasi Fotokatalis TiO₂ Pada Degradasi Limbah Cair Zat Warna Tekstil, *Lomba Karya Ilmiah Sumber Daya Air Tahun 2014*
- Saini, R.D. 2017. Textile Organic Dyes: Polluting effects and Elimination Methods from Textile Waste Water. *International Journal of Chemical Engineering Research*, 9(1): 121-136.
- Samir, M.A.S.A., Alloin, F., Dufresne, A. 2005. Review of Recent Research into Cellulosic Whiskers, Their Properties and Their Application in Nanocomposite Field. *Biomacromolecules*, 6(2): 612–626.
- Sarkar, M., Denrah, S., Das, M., Das, M. 2021. Statistical optimization of bio-mediated silver nanoparticles synthesis for use in catalytic degradation of some azo dyes. *Chemical Physics Impact*, 3: 100053.
- Sathishkumar, P., Preethi, J., Vijayan, R., Yusoff, A.R.M., Ameen, F., Suresh, S. 2016. Anti-acne, anti-dandruff and anti-breast cancer efficacy of green synthesized silver nanoparticles using *Coriandrum sativum* leaf extract. *Journal of Photochemical Photobiology*, 163:69–76.
- Segal, L., Creely, J.J., Martin, Jr. A.E., Conrad, C.M. 1959. An empirical method for estimating the degree of crystallinity of native cellulose using the X-ray diffractometer. *Textile Research Journal*, 29(10): 786-794.
- Shafawi, A.N., Mahmud, R.A., Ali, K.A., Putri, L.K., Rosli, N.I.M., Mohamed, A.R. Bi₂O₃ particles decorated on porous g-C₃N₄ sheets: enhanced photocatalytic activity through a direct Z-scheme mechanism for degradation of Reactive Black 5 under UV-vis light, *Journal of Photochemistry and Photobiology A: Chemistry*, 389, 112289.

- Shah, T.A., Ali, S., Afzal, A., Tabassum, R. 2018. Simultaneous Pretreatment and Biohydrogen Production from Wheat Straw by Newly Isolated Ligninolytic *Bacillus* Sp. Strains with Two-Stage Batch Fermentation System. *BioEnergy Research*, 11: 835–849.
- Sharma, P., Pant, S., Rai, S., Yadav, R.B., Dave, V. 2017. Green synthesis of silver nanoparticle capped with allium cepa and their catalytic reduction of textile dyes: an ecofriendly approach. *Journal of Polymer Environment*, 26:1795–803.
- Singh, H.B., Bharati, K.A., 2014, *Handbook of natural dyes and pigments*, Woodhead Publishing, New Delhi
- Singh, A.K., Talat, M., Singh, D.P., Srivastava, O.N. 2010. Biosynthesis of gold and silver nanoparticles by natural precursor clove and their functionalization with amine group. *Journal of Nanoparticle Research*, 12: 1667–1675.
- Singh, J., dan Dhaliwal, A. S. 2017. Plasmon-induced photocatalytic degradation of methylene blue dye using biosynthesized silver nanoparticles as photocatalyst. *Environmental Technology*, 38:12.
- Singhania, R.R., Patel, A.K., Tseng, Y.S., Kumar, V., Chen, C.W., Haldar, D., Saini, J.K., Dong, C.D. 2022. Developments in bioprocess for bacterial cellulose production. *Bioresource Technology*, 344: 126343.
- Soltani, T. dan Entezari, M.H. 2013. Photolysis and photocatalysis of methylene blue by ferrite bismuth nanoparticles under sunlight irradiation. *Journal of Molecular Catalysis A: Chemical*, 377: 197–203.
- Sun, B., Zhang, L., Wei, F., AL-Ammari, A., Xu, X., Li, W., Chen, C., Lin, J., Zhang, H., Sun, D. 2020. In situ structural modification of bacterial cellulose by sodium fluoride. *Carbohydrate Polymers*, 231: 115765.
- Sun, R.C. 2008. Detoxification of Biomass of Bioethanol. *Bioresources*, 4(2), 452–455.
- Tavker, N., Gaur, U., K., Sharma, M. 2020. Agro-waste extracted cellulose supported silver phosphate nanostructures as a green photocatalyst for improved photodegradation of RhB dye and industrial fertilizer effluents. *Nanoscale Advances*, 2(7): 2870–2884.
- Thu, T.N.T., Thi, N.N., Quang, V.T., Hong, K.N., Minh, T.N., Hoai, N.L.T. 2016. Synthesis, characterisation, and effect of pH on degradation of dyes of copper-doped TiO₂. *Journal of Experimental Nanoscience*, 11(3): 226–238.
- Torgbo, S. dan Sukyai, P. 2020. Biodegradation and thermal stability of bacterial cellulose as biomaterial: The relevance in biomedical applications. *Polymer Degradation and Stability*, 179:109232.
- Ul-Islam, M., Khan, T., Park, J.K. 2012. Water Holding and Release Properties of Bacterial Cellulose Obtained by in Situ and Ex Situ Modification. *Carbohydrate Polymers*, 88: 596–603.
- Vandamme, E. J., De Baets, S., Vanbaelen, A., Joris, K., & De Wulf, P. 1998. Improved production of bacterial cellulose and its application potential. *Polymer Degradation and Stability*, 59(1): 93–99.
- Veldkamp, J.F. 2004. *Bilimbia* (Lichenes) resurrected. *Lichenologist*, 36:191–5.

- Wahid, F., Huang, L.H., Zhao, X.Q., Li, W.C., Wang, Y.Y., Jia, S.R., Zhong, C. 2021. Bacterial cellulose and its potential for biomedical applications. *Biotechnology Advances*, 53: 107856.
- Wahyudi, N.A. 2022. Ekspor Tekstil 2022 Ditarget Rp171,6 Triliun, Indonesia Rebut Pasar Eropa dan AS. <https://ekonomi.bisnis.com/read/20220209/12/1498746/ekspor-tekstil-2022-ditarget-rp1716-triliun-indonesia-rebut-pasar-eropa-dan-as> (diakses pada 14 Juli 2023)
- Wan, Y.Z., Hong, L., Jia, S.R., Huang, Y., Zhu, Y., Wang, Y.L., Jiang, H.J. 2006. Synthesis and characterization of hydroxyapatite–bacterial cellulose nanocomposites, *Composites Science and Technology*, 66(11-12): 1825–1832.
- Wang, Q., Cai, J., Zhang, L. 2014. In situ synthesis of Ag₃PO₄/cellulose nanocomposites with photocatalytic activities under sunlight. *Cellulose*, 21: 3371–3382.
- Wang, SS, Han, YH, Ye, YX. 2017. Physicochemical characterization of high-quality bacterial cellulose produced by *Komagataeibacter* sp. strain W1 and identification of the associated genes in bacterial cellulose production. *RSC Advances*, 7(71):45145–45155.
- Wang, J., Tavakoli, J., Tang, Y. 2019. Bacterial cellulose production, properties and applications with different culture methods – A review. *Carbohydrate Polymers*, 219: 63–76.
- Watanabe, K., Tabuchi, M., Morinaga, Y., Yoshinaga, F. 1998. Structural features and properties of bacterial cellulose produced in agitated culture. *Cellulose*, 5: 187–200.
- Wu, Xi., Xiang, Z., Song, T., Qi, H. 2019. Wet-strength agent improves recyclability of dip-catalyst fabricated from gold nanoparticle-embedded bacterial cellulose and plant fibers. *Cellulose*, 26: 3375–3386.
- Xu, T., Jiang, Q., Ghim, D., Liu, K.K., Sun, H., Derami, H.G., Wang, Z., Tadepalli, S., Jun, Y.S., Zhang, Q., and Singamaneni, S. 2018. Catalytically Active Bacterial Nanocellulose-Based Ultrafiltration Membrane. *Small*, 1704006.
- Yamanaka, S., Watanabe, K., Kitamura, N. 1989. The structure and mechanical properties of sheet prepared from bacterial cellulose. *Journal of Materials Science*, 24: 3141-3145.
- Yang, G., Xie, J., Deng, Y., Bian, Y., Hong, F. 2012a. Hydrothermal synthesis of bacterial cellulose/AgNPs composite: A ‘green’ route for antibacterial application. *Carbohydrate Polymers*, 87(4):2482–7.
- Yang, G., Xie, J., Hong, F., Cao, Z., Yang, X. 2012b. Antimicrobial activity of silver nanoparticle impregnated bacterial cellulose membrane: Effect of fermentation carbon sources of bacterial cellulose. *Carbohydrate Polymers*, 87: 839–845.
- Yang, G., Wang, C., Hong, F., Yang, X., Cao, Z. 2015. Preparation and characterization of BC/PAM-AgNPs nanocomposites for antibacterial applications. *Carbohydrate Polymers*, 115:636–42.

- Yang, Y., Chen, Z., Wu, X., Zhang, X., Yuan, G. 2018. Nanoporous cellulose membrane doped with silver for continuous catalytic decolorization of organic dyes. *Cellulose*, 25, 2547–2558.
- Yassine, F., Bassil, N., Chokr, A., El Samrani, A., Serghei, A., Boiteux, G., El Tahchi, M. 2016. Two-step formation mechanism of *Acetobacter* cellulosic biofilm: Synthesis of sparse and compact cellulose. *Cellulose*, 23: 1087–1100.
- Ye, Y., Bruning, H., Yntema, D., Mayer, M., Rijnaarts, H. Homogeneous photosensitized degradation of pharmaceuticals by using red light LED as light source and methylene blue as photosensitizer. *Chemical Engineering Journal*, 316: 872.
- Yin, N., Santos, TMA, Auer, GK. 2014. Bacterial cellulose as a substrate for microbial cell culture. *Applied Environmental Microbiology*, 80(6):1926–1932.
- Yu, Z., dan Chuang, S.S.C. 2007. Probing Methylene Blue Photocatalytic Degradation by Adsorbed Ethanol with In Situ. *The Journal of Physical Chemistry C*, 111(37): 13813–13820.
- Zeng, M, Laromaine, A, Roig A. 2014. Bacterial cellulose films: influence of bacterial strain and drying route on film properties. *Cellulose*, 21(6):4455–4469.
- Zhang, C., Wang, L., Zhao, J., Zhu, P. 2011. Effect of Drying Methods on Structure and Mechanical Properties of Bacterial Cellulose Films. *Advanced Materials Research*, 239-242: 2667-2670.
- Zhang, L., Ruan, D., Zhou, J. 2001. Structure and properties of regenerated cellulose films prepared from cotton Linters in NaOH/ Urea aqueous solution. *Industrial & Engineering Chemistry Research*, 40, 5923–5928.
- Zhou, S., Ray, A.K. 2003. Kinetic studies for photocatalytic degradation of eosin B on a thin film of titanium dioxide. *Industrial & Engineering Chemistry Research*, 42(24):6020–6033.
- Zollinger, H., 2003, *Colour chemistry: synthesis, properties, and applications of organic dyes and pigments*, Wiley, Zürich Switzerland.