

## DAFTAR PUSTAKA

- Abdel-Aziz, S.M., Gupta, V.K., Sukmawati, D. dan Fadel, M. 2016. Role of nutrient in microbial developments and microbial metabolic diversity. *Microbial Applications*, pp.151-176.
- Adryan, A., Widyastuti, R. dan Djajakirana, G. 2017. Isolasi dan identifikasi mikroba tanah pendegradasi selulosa dan pektin dari rhizosfer *Aquilaria malaccensis* Isolation and Identification of Cellulose and Pectin-Degrading Soil Microbes from Rhizosphere of *Aquilaria malaccensis*, 1(1): 58-64.
- Agarwal, H., Bajpai, S., Mishra, A., Kohli, I., Varma, A., Fouillaud, M., Dufossé, L. dan Joshi, N.C. 2023. Bacterial pigments and their multifaceted roles in contemporary biotechnology and pharmacological applications. *Microorganisms*, 11(3): 614.
- Al-Dhabi, N.A., Esmail, G.A., Mohammed Ghilan, A.K. dan Valan Arasu, M. 2019. Composting of vegetable waste using microbial consortium and biocontrol efficacy of *Streptomyces* Sp. Al-Dhabi 30 isolated from the Saudi Arabian environment for sustainable agriculture. *Sustainability*, 11(23): 6845.
- Alfauzi, R.A., Hartati, L., Suhendra, D., Rahayu, T.P. dan Hidayah, N. 2022. Ekstraksi senyawa bioaktif kulit jengkol (*Archidendron jiringa*) dengan konsentrasi pelarut metanol berbeda sebagai pakan tambahan ternak ruminansia. *Jurnal Ilmu Nutrisi dan Teknologi Pakan*, 20(3): 95-103.
- Altieri, K.T., Sanitá, P.V., Machado, A.L., Giampaolo, E.T., Pavarina, A.C., Jorge, J.H. dan Vergani, C.E. 2013. Eradication of a mature methicillin-resistant *Staphylococcus aureus* (MRSA) biofilm from acrylic surfaces. *Brazilian dental journal*, 24(5): 487-491.
- Ammar, E.M., Martin, J., Brabo-Catala, L. dan Philippidis, G.P. 2020. Propionic acid production by *Propionibacterium freudenreichii* using sweet sorghum bagasse hydrolysate. *Applied Microbiology and Biotechnology*, 104(22): 9619-9629.
- Aniyan, N.B. dan Thomas, S.K. 2019 Solid state fermentation for prodigiosin production using *Serratia marcescens*. *International Research Journal of Engineering and Technology (IRJET)*, 6(4): 330-335.
- Aryal, S. 2015. Microbiology info. Mueller Hinton agar (MHA) - composition, principle, uses, and preparation. Diakses tanggal 21 Januari 2023.

<<http://www.microbiologyinfo.com/mueller-hinton-agar-mha> composition principle uses-and-preparation>.

- Barakat, K.M., Mattar, M.Z., Sabae, S.Z., Darwesh, O.M. dan Hassan, S.H. 2015. Production and characterization of bioactive pyocyanin pigment by marine *Pseudomonas aeruginosa* OSh1. *Research Journal of Pharmaceutical Biological and Chemical Sciences*, 6(5): 933-943.
- Berde, C.V. dan Berde, V.B. 2015. Vegetable waste as alternative microbiological media for laboratory and industry. *World Journal of Pharmacy and Pharmaceutical Sciences*, 4(5): 1488-1494.
- Bhagwat, A. dan Padalia, U. 2020. Optimization of prodigiosin biosynthesis by *Serratia marcescens* using unconventional bioresources. *Journal of Genetic Engineering and Biotechnology*, 18(26): 1-9.
- Bin, L., Wei, L., Xiaohong, C., Mei, J. dan Mingsheng, D. 2012. In vitro antibiofilm activity of the melanin from *Auricularia auricula*, an edible jelly mushroom. *Annals of microbiology*, 62(4): 1523-1530.
- Biutifasari, V. 2018. Extended spectrum beta-lactamase (ESBL). *Oceana Biomedicina Journal*, 1(1): 3-3.
- Breijyeh, Z., Jubeh, B. dan Karaman, R. 2020. Resistance of gram-negative bacteria to current antibacterial agents and approaches to resolve it. *Molecules*, 25(6): 1340.
- Chaturvedi, S.B., Mainali, S. and Chaudhary, R., 2023. Antibacterial activity of pigment extracted from pigment producing bacteria. *Research space*, 1-12.
- David, A. 2023. Submerged fermentation: the versatile process for industrial biotechnology. *Fermentation Technology*, 12: 16 .
- Dharmaraj, S., Ashokkumar, B. dan Dhevendaran, K. 2009. Food-grade pigments from *Streptomyces* sp. isolated from the marine sponge *Callyspongia diffusa*. *Food. Res. Int.* 42: 487–492.
- De León, M.E., Wilson, H.S., Jospin, G. dan Eisen, J.A. 2021. Draft genome sequences and genomic analysis for pigment production in bacteria isolated from blue discolored Soymilk and Tofu. *Journal of Genomics*, 9: 55-67.
- Deveikaite, G. dan Zvirdauskiene, R. 2023. Isolation and characterisation of pigments from pigment-producing microorganisms isolated from environment and their antibacterial activity. *Rural Sustainability Research*, 49(344): 1-7.

- Dewi, M., Darmawi, D., Nurliana, N., Karmil, T.F., Helmi, T.Z., Fakhurrazi, F., Erina, E., Abrar, M. dan Admi, M. 2020. Aktivitas antibiotik terhadap biofilm *Staphylococcus aureus* isolat preputium sapi Aceh. *Jurnal Sain Veteriner*, 38(1): 1-6.
- Duran, N., Justo, G.Z., Ferreira, C.V., Melo, P.S., Cordi, L. dan Martins, D. 2007. Violacein: properties and biological activities. *Biotechnol. Appl. Biochem.* 48: 127–133.
- Dalynn Biologicals. 2014. McFarland standard. Diakses tanggal 28 Januari 2023. <[http://www.dalynn.com/dyn/ck\\_assets/files/tech/TM53.pdf](http://www.dalynn.com/dyn/ck_assets/files/tech/TM53.pdf)>.
- El-Fouly, M.Z., Sharaf, A.M., Shahin, A.A. M., El-Bialy, H.A. dan Omara, A.M.A. 2015. Biosynthesis of pyocyanin pigment by *Pseudomonas aeruginosa*. *J. Radiat. Res. Appl. Sci.* 8: 36–48
- Forson, A.M., Rosman, C.W., Van Kooten, T.G., Van Der Mei, H.C. dan Sjollema, J. 2022. Micrococcal nuclease stimulates *Staphylococcus aureus* biofilm formation in a murine implant infection model. *Frontiers in Cellular and Infection Microbiology*, 11(799845): 1-13.
- Fadlilla, T., Budiastuti, M.S. dan Rosariastuti, M.R. 2023. Potential of fruit and vegetable waste as eco-enzyme fertilizer for plants. *Jurnal Penelitian Pendidikan IPA*, 9(4): 2191-2200.
- Fitri, A.C.K. dan Proborini, W.D. 2018. Analisa komposisi minyak atsiri kulit jeruk manis hasil ekstraksi metode microwave hydrodiffusion and gravity dengan GC-MS. *Reka Buana: Jurnal Ilmiah Teknik Sipil dan Teknik Kimia*, 3(1): 53-58.
- Garde, S., Chodiseti, P.K. dan Reddy, M. 2021. Peptidoglycan: structure, synthesis, and regulation. *EcoSal Plus*, 9(2).
- Gaucher, F., Gagnaire, V., Rabah, H., Maillard, M.B., Bonnassie, S., Pottier, S., Marchand, P., Jan, G., Blanc, P. dan Jeantet, R. 2019. Taking advantage of bacterial adaptation in order to optimize industrial production of dry *Propionibacterium freudenreichii*. *Microorganisms*, 7(10): 477.
- Gupta, A., Gupta, R. dan Singh, R.L. 2017. Microbes and environment. *Principles and applications of environmental biotechnology for a sustainable future*, pp. 43-84.
- Harlis, H., Budiarti, R.S., Kapli, H. dan Sanjaya, M.E. 2019. Produksi pupuk cair dari isolat bakteri limbah sayur Pasar Angso Duo Jambi dalam meningkatkan

perekonomian dan kesehatan lingkungan masyarakat Jambi. *Biospecies*, 12(1): 40-48.

- Huang, S., Chen, X., Yan, R., Huang, M. dan Chen, D. 2022. Isolation, identification and antibacterial mechanism of the main antibacterial component from pickled and dried mustard (*Brassica juncea* Coss. Var. *foliosa* Bailey). *Molecules*, 27(8): 2418.
- Huigens, III, R.W., Brummel, B.R., Tenneti, S., Garrison, A.T. dan Xiao, T. 2022. Pyrazine and phenazine heterocycles: Platforms for total synthesis and drug discovery. *Molecules*, 27(3): 1112.
- Hwang, T.Y., Qi, H.A., Kin, C.M., Shing, W.L., Sinouvassane, D. dan Chinnasamy, T. 2021. Potential of fruit peel waste in growing cyanobacteria *Anabaena cylindrica*. *International Journal of Technology*, 12(4): 711-719.
- Jamal, M., Ahmad, W., Andleeb, S., Jalil, F., Imran, M., Nawaz, M.A., Hussain, T., Ali, M., Rafiq, M. dan Kamil, M.A. 2018. Bacterial biofilm and associated infections. *Journal of the chinese medical association*, 81(1): 7-11.
- Jenab, A., Roghanian, R. dan Emtiazi, G. 2020. Bacterial natural compounds with anti-inflammatory and immunomodulatory properties (mini review). *Drug Design, Development and Therapy*, 14: 3787-3801.
- Ji, Q.Y., Wang, W., Yan, H., Qu, H., Liu, Y., Qian, Y. dan Gu, R., 2023. The effect of different organic acids and their combination on the cell barrier and biofilm of *Escherichia coli*. *Foods*, 12(16): 3011.
- Joegijantoro, R. 2019. *Penyakit infeksi*. Intimedia, Malang, pp. 3-14.
- Kramar, A., Ilic-Tomic, T., Petkovic, M., Radulović, N., Kostic, M., Jovic, D. dan Nikodinovic-Runic, J. 2014. Crude bacterial extracts of two new *Streptomyces* sp. isolates as bio-colorants for textile dyeing. *World Journal of Microbiology and Biotechnology*, 30: 2231-2240.
- Kim, A.L., Park, S., Hong, Y.K., Shin, J.H. dan Joo, S.H. 2021. Isolation and characterization of beneficial bacteria from food process wastes. *Microorganisms*, 9(6): 1156.
- Lee J.E, Lee N.K. dan Paik, H.D. 2020. Antimicrobial and anti-biofilm effects of probiotic *Lactobacillus plantarum* KU200656 isolated from kimchi. *Food Sci Biotechnol*, 30: 97-106.
- Lee, J.S., Lin, C.J., Lee, W.C., Teng, H.Y. dan Chuang, M.H. 2022. Production of succinic acid through the fermentation of *Actinobacillus succinogenes* on the

- hydrolysate of Napier grass. *Biotechnology for Biofuels and Bioproducts*, 15(1): 9.
- Lin, C., Jia, X., Fang, Y., Chen, L., Zhang, H., Lin, R. dan Chen, J. 2019. Enhanced production of prodigiosin by *Serratia marcescens* FZSF02 in the form of pigment pellets. *Electronic Journal of Biotechnology*, 40: 58-64.
- Leonita, S., Bintang, M. dan Pasaribu, F.H. 2015. Isolation and identification of endophytic bacteria from *Ficus variegata* blume as antibacterial compounds producer. *Current Biochemistry*, 2(3): 116-128.
- Maida, S. dan Lestari, K.A.P. 2019. Aktivitas antibakteri amoksisilin terhadap bakteri gram positif dan bakteri gram negatif. *Jurnal Pijar MIPA*, 14(3): 189-191.
- Mardiah, M. 2017. Uji resistensi *Staphylococcus aureus* terhadap antibiotik, amoxillin, tetracyclin dan propolis. *Jurnal Ilmu Alam dan Lingkungan*, 8(16): 1-6.
- Maulid, R.R. 2015. Kadar total pigmen klorofil dan senyawa antosianin ekstrak kastuba (*Euphorbia pulcherrima*) berdasarkan umur daun. *Prosiding KPSDA*, 1(1): 225-230.
- Mamlouk, D. dan Gullo, M. 2013. Acetic Acid bacteria: physiology and carbon sources oxidation. *Indian Journal Microbiol*, 53: 377-384.
- Mienda, B.S., Idi, A. dan Umar, A. 2011. Microbiological features of solid state fermentation and its applications-An overview. *Research in Biotechnology*, 2(6): 21-26.
- Miller, T., Waturangi, D.E. dan Yogiara. 2022. Antibiofilm properties of bioactive compounds from *Actinomycetes* against foodborne and fish pathogens. *Scientific Reports*, 12(1): 18614.
- Mortzfeld, F.B., Hashem, C., Vranková, K., Winkler, M. dan Rudroff, F. 2020. Pyrazines: Synthesis and industrial application of these valuable flavor and fragrance compounds. *Biotechnology Journal*, 15(11): 2000064.
- Muñoz-Miranda, L.A. dan Iñiguez-Moreno, M. 2023. An extensive review of marine pigments: sources, biotechnological applications, and sustainability. *Aquatic Sciences*, 85(3): 68.
- Naisi, S., Bayat, M., Salehi, T.Z., Zarif, B.R. dan Yahyaraeyat, R. 2023. Antimicrobial and anti-biofilm effects of carotenoid pigment extracted from

*Rhodotorula glutinis* strain on food-borne bacteria. *Iranian Journal of Microbiology*, 15(1): 79-88.

Narsing, R.M.P., Xiao, M. dan Li, W.J. 2017. Fungal and bacterial pigments: secondary metabolites with wide applications. *Frontiers in microbiology*, 8(1113): 1-13.

Nassima, B., Nassima, B. dan Riadh, K. 2019. Antimicrobial and antibiofilm activities of phenolic compounds extracted from *Populus nigra* and *Populus alba* buds (Algeria). *Brazilian Journal of Pharmaceutical Sciences*, 55: e18114.

Nuryah, A., Yuniarti, N. dan Puspitasari, I. 2019. Prevalensi dan evaluasi kesesuaian penggunaan antibiotik pada pasien dengan infeksi methicillin resistant *Staphylococcus aureus* di RSUP Dr. Soeradji Tirtonegoro Klaten. *Majalah Farmaseutik*, 15(2): 123-129.

Olawuwo, O.S., Famuyide, I.M. dan McGaw, L.J. 2022. Antibacterial and antibiofilm activity of selected medicinal plant leaf extracts against pathogens implicated in poultry diseases. *Frontiers in Veterinary Science*, 9.

Paramastri, P.K. dan Qurrohman, M.T. 2022. Efektifitas ekstrak lidah mertua (*Sansevieria trifasciata* var *laurentii*) sebagai antifungi *Candida albicans*. *The Journal of Muhammadiyah Medical Laboratory Technologist*, 5(2):149-158.

Piechota, M., Kot, B., Frankowska-Maciejewska, A., Gruzewska, A. dan Woźniak-Kosek, A. 2018. Biofilm formation by methicillin-resistant and methicillin-sensitive *Staphylococcus aureus* strains from hospitalized patients in Poland. *BioMed Research International*, 2018.

Poorniammal, R., Prabhu, S., Dufossé, L. dan Kannan, J. 2021. Safety evaluation of fungal pigments for food applications. *Journal of Fungi*, 7(9): 692.

Pratiwi, R.H. 2017. Mekanisme pertahanan bakteri patogen terhadap antibiotik. *Jurnal Pro-life*, 4(3): 418-429.

Rahman, I.W., Fadlilah, R.N., Kristiana, H.N. dan Dirga, A. 2022. Potensi ekstrak daun jambu biji (*Psidium guajava*) dalam menghambat pertumbuhan *Serratia marcescens*. *Jurnal Ilmu Alam dan Lingkungan*, 13(1): 14-22.

Raji, E.F., P.A. dan Nawas, T. 2018. Pyocyanin: a powerful inhibitor of bacterial growth and biofilm formation. *Madridge Journal Case Rep Study*, 3(1): 101-107.



- Ramesh, C., Vinithkumar, N.V., Kirubakaran, R., Venil, C.K. dan Dufossé, L. 2019. Multifaceted applications of microbial pigments: current knowledge, challenges and future directions for public health implications. *Microorganisms*, 7(7): 186.
- Ranaei, V., Pilevar, Z., Khaneghah, A.M. dan Hosseini, H. 2020. Propionic acid: method of production, current state and perspectives. *Food technology and biotechnology*, 58(2): 115.
- Rangaswamy, B.E., Vanitha, K.P. dan Hungund, B.S. 2015. Microbial cellulose production from bacteria isolated from rotten fruit. *International journal of polymer science*, 2015.
- Ratnakaran, P., Bhoir, M. dan Durve-Gupta, A. 2020. Isolation and characterization of pigment producing bacteria isolated from waste. *International Journal of Applied Research*, 6(4): 252-260.
- Ray, B. 2004. *Fundamental food microbiology*. Third edition. Boca Raton: CRC Press, pp. 23-33.
- Rompas, S.A.T., Wewengkang, D.S. dan Mpila, D.A. 2022. Uji aktivitas antibakteri organisme laut Tunikata *Polycarpa aurata* terhadap bakteri *Escherichia coli* dan *Staphylococcus aureus*. *PHARMACON*, 11(1): 1271-1278.
- Saggu, S.K., Jha, G. dan Mishra, P.C. 2019. Enzymatic degradation of biofilm by metalloprotease from *Microbacterium* sp. SKS10. *Frontiers in bioengineering and biotechnology*, 7: 192.
- Santos, F.P.D., Magalhães, D.C.M.M.D., Nascimento, J.D.S. dan Ramos, G.L.D.P.A., 2022. Use of products of vegetable origin and waste from hortofruticulture for alternative culture media. *Food Science and Technology*, 42: 1-4.
- Sasmita, A.H., Sapriati, A.N. dan Kursia, S. 2018. Isolasi dan identifikasi bakteri asam laktat dari liur basa (limbah sayur bayam dan sawi). *As-Syifaa*, 10(2): 141-151.
- Sayuti, I. dan Hardianti, N. 2016. Identifikasi bakteri pada sampah organik pasar kota Pekanbaru dan potensinya sebagai rancangan lembar kerja siswa (LKS) biologi SMA. *Biogenesis*, 13(1): 51-60.
- Shouman, H., Said, H.S., Kenawy, H.I. dan Hassan, R. 2023. Molecular and biological characterization of pyocyanin from clinical and environmental *Pseudomonas aeruginosa*. *Microbial Cell Factories*, 22(1): 166.

- Silhavy, T.J., Kahne, D. dan Walker, S. 2010. The bacterial cell envelope. *Cold Spring Harbor perspectives in biology*, 2(5): p.a000414.
- Solano, F. 2014. Melanins: skin pigments and much more—types, structural models, biological functions, and formation routes. *New Journal of Science*, 2014: 1-28.
- Solihin, J., Waturangi, D.E. dan Purwadaria, T. 2021. Induction of amylase and protease as antibiofilm agents by starch, casein, and yeast extract in *Arthrobacter* sp. CW01. *BMC microbiology*, 21: 1-12.
- Subramaniam, R. dan Vimala, R. 2012. Solid state and submerged fermentation for the production of bioactive substances: a comparative study. *International Journal of Science and Nature*, 3(3): 480-486.
- Sudhakar, T., Karpagam, S. dan Sabapathy, S. 2013. Analysis of pyocyanin compound and its antagonistic activity against phytopathogens., 5(3): 1101-1106.
- Tobi, C.H.B., Saptarini, O. dan Rahmawati, I. 2022. Aktivitas antibiofilm ekstrak dan fraksi-fraksi biji pinang (*Areca catechu* L.) terhadap *Staphylococcus aureus* ATCC 25923. *Journal of Pharmaceutical Science and Clinical Research*, 7(1): 56-70.
- Trifani, R., Rabinowitz, O., Abdillah, S. dan Sinaga, E. 2022. GC-MS and LC-MS/MS Analysis of *Bouea macrophylla* fruit juice. *International Journal of Biological, Physical and Chemical Studies*, 4(2): 1-10.
- Trizna, E.Y., Baydamshina, D.R., Kholyavka, M.G., Sharafutdinov, I.S., Hairutdinova, A.R., Khafizova, F.A., Zakirova, E.Y., Hafizov, R.G., Bogachev, M.I. dan Kayumov, A.R. 2016. Soluble and immobilized papain and trypsin as destroyers of bacterial biofilms. *Genes & Cells*, 10(3): 106-112.
- Tuon, F.F., Suss, P.H., Telles, J.P., Dantas, L.R., Borges, N.H. dan Ribeiro, V.S.T. 2023. Antimicrobial treatment of *Staphylococcus aureus* biofilms. *Antibiotics*, 12(1): 87.
- Ude, J., Tripathi, V., Buyck, J.M., Söderholm, S., Cunrath, O., Fanous, J., Claudi, B., Egli, A., Schleberger, C., Hiller, S. dan Bumann, D. 2021. Outer membrane permeability: antimicrobials and diverse nutrients bypass porins in *Pseudomonas aeruginosa*. *Proceedings of the National Academy of Sciences*, 118(31): p.e2107644118.



- Utama, C. S., Sulistiyanto, B. dan Setiani, B.E. 2013. Profil Mikrobiologis pollard yang difermentasi dengan ekstrak limbah pasar sayur pada lama peram yang berbeda. *Agripet*, 13(2): 26-30.
- Uruén, C., Chopo-Escuin, G., Tommassen, J., Mainar-Jaime, R.C. dan Arenas, J. 2020. Biofilms as promoters of bacterial antibiotic resistance and tolerance. *Antibiotics*, 10(1): 3.
- Vázquez-Sánchez, D. dan Rodríguez-López, P. 2018. Biofilm Formation of *Staphylococcus aureus*. *Staphylococcus aureus*. Academic Press, pp. 87-103.
- Venil, C.K., Zakaria, Z.A. dan Ahmad, W.A. 2013. Bacterial pigments and their applications. *Process Biochemistry*, 48(7): 1065-1079.
- Wadday, A.K., Saleh, Z.A., dan Al-Marjani, M.F. 2019. Spectroscopic characteristics and energy transfer of bacterial pigment: (pyocyanin/curcumin). *AIP Conference Proceedings*, 2201(1): 020014.
- Wahyuni, S., Patang, P. dan Putra, R.P. 2023. Kajian minimum inhibitor concentration (MIC) dan minimum bactericidal concentration (MBC) ekstrak kulit terong ungu (*Solanum melongena* L) sebagai pengembangan antibakteri herbal. *Jurnal Pendidikan Teknologi Pertanian*, 9(2): 249-262.
- Wicaksono, S., Kusdiyantini, E. dan Raharjo, B. 2017. Pertumbuhan dan produksi pigmen merah oleh *Serratia marcescens* pada berbagai sumber karbon. *Jurnal Akademika Biologi*, 6(3): 66-75.
- Wikananda, I.D.A.R.N., Hendrayana, M.A. dan Pinatih, K.J.P. 2019. Efek antibakteri ekstrak ethanol kulit batang tanaman cempaka kuning (*M. champaca* L.) terhadap pertumbuhan *Staphylococcus aureus*. *Jurnal Medika*, 8(5): 2597-8012.
- Witasari, L.D., Wahyu, K.W., Anugrahani, B.J., Kurniawan, D.C., Haryanto, A., Nandika, D., Karlinasari, L., Arinana, A., Batubara, I., Santoso, D. dan Rachmayanti, Y. 2022. Antimicrobial activities of fungus comb extracts isolated from Indomalayan termite (*Macrotermes gilvus* Hagen) mound. *AMB Express*, 12(1): 14.
- World Health Organization. *Record response to WHO's call for antimicrobial resistance surveillance reports in 2020*. 2020. Diakses tanggal 28 Maret 2023. <<https://www.who.int/news/item/09-06-2021-record-response-to-who-s-call-for-antimicrobial-resistance-surveillance-reports-in-2020>>.

- World Health Organization. *Antimicrobial resistance*. 2021. Diakses tanggal 28 Maret 2023. <<https://www.who.int/news-room/fact-sheets/detail/antimicrobial-resistance>>.
- Yuni, N.S.M., Syukur, Y.N. dan Sari, S.J. 2013. Isolasi, karakterisasi, dan identifikasi DNA bakteri asam laktat (BAL) yang berpotensi sebagai antimikroba dari fermentasi markisa kuning (*Passiflora edulis* Var. *Flavicarpa*). *Jurnal Kimia Unand*, 2(2): 81-91.
- Yolmeh, M. 2016. Antimicrobial activity of pigments extracted from *Rhodotorula glutinis* against some bacteria and fungi. *Zahedan Journal of Research in Medical Sciences*, 18(22): e4954.
- Zimmerli, W. dan Sendi, P. 2011. Pathogenesis of Implant-Associated Infection: The Role of the Host. *Seminar Immunopathol.* 33(3): 295–306.
- Zulfikar, M.F., Kusdiyantini, E. dan Jannah, S.N. 2017. Identifikasi jenis pigmen dan uji potensi antioksidan ekstrak pigmen bakteri *Rhodococcus* sp. hasil isolasi dari sedimen Sumber Air Panas Gedong Songo. *Jurnal Akademika Biologi*, 6(4): 106-114.
- Zhu, H., He, C.C. dan Chu, Q.H. 2011. Inhibition of quorum sensing in *Chromobacterium violaceum* by pigments extracted from *Auricularia auricular*. *Lett Appl Microbiol*, 52: 269-274.