DAFTAR PUSTAKA

Abouelhassan, Y., Garrison, A. T., Burch, G. M., Wong, W., Norwood, V. M., & Huigens, R. W., 2014, Discovery of quinoline small molecules with potent dispersal activity against methicillin-resistant *Staphylococcus aureus* and *Staphylococcus epidermidis* biofilms using a scaffold hopping strategy. *Bioorg Med Chem Lett* , 24(21): 5076–5080.

Akca, A.E., Akca, G., Topçu, F.T., Macit, E., Pikdöken, L., Özgen, I.F., 2016, The comparative evaluation of the antimicrobial effect of propolis with chlorhexidine against oral pathogens: an in vitro study, *Biomed Res Int*., 2016: 3627463.

Aleksijević, L. H., Aleksijević, M., Škrlec, I., Šram, M., Šram, M., & Talapko, J., 2022, *Porphyromonas gingivalis* Virulence Factors and Clinical Significance in Periodontal Disease and Coronary Artery Diseases, *Pathogens.,* 11(10): 1173.

Alghamdi, F., & Shakir, M., 2020, The Influence of *Enterococcus faecalis* as a Dental Root Canal Pathogen on Endodontic Treatment: A Systematic Review, *Cureus*. 12(3): e7257.

Ali, A., Mustofa, Asmara, W., Rante, H., Widada, J., 2018, Diversity and functional characterization of antifungal-producing *Streptomyces*-like microbes isolated from the rhizosphere of cajuput plants (*Melaleuca leucodendron* L.), *Malays. J. Microbiol*., 14(7): 663-673.

Alimuddin, Asmara, W., Widada, J., Mustofa. and Nurjasmi, R., 2010. An Actinomycetes producing anticandida isolated from cajuput rhizosphere: partial identification of isolates and amplification of pks-I genes, *Indones. J. Biotechnol.*, 15(1): 1-8.

Al-Madi, E. M., Almohaimede, A. A., Al-Obaida, M. I., & Awaad, A. S., 2019, Comparison of the antibacterial efficacy of commiphora molmol and sodium hypochlorite as root canal irrigants against *Enterococcus faecalis* and *Fusobacterium nucleatum. eCAM*, 2019: 6916795.

Almeida MC, Resende DISP, da Costa PM, Pinto MMM, Sousa E., 2021, Tryptophan derived natural marine alkaloids and synthetic derivatives as promising antimicrobial agents. *Eur J Med Chem.*, 209:112945.

Amin, M., Ariwibowo, T., & Anggriani, M., 2022**,** Perbedaan kadar tumor *necrosis factor-alpha* dalam darah vena pada pasien dengan periodontitis apikalis dan pulpa normal*, J. Kedokt. Gigi Univ. Padjadjaran,* 34(3): 202-207.

Arai M. A., 2021, Target protein-oriented isolations for bioactive natural products. *Chem Pharm Bull* , 69(6): 503–515.

Ardila, C.M., Granada, M.I., Guzmán, I.C., 2010, Antibiotic resistance of subgingival species in chronic periodontitis patients. *J Periodontal Res*., 45(4): 557-563.

Arias, C. A., Contreras, G. A., & Murray, B. E., 2010, Management of multidrug-resistant enterococcal infections. *Clinical microbiology and infection : the*

official publication of the European Society of Clinical Microbiology and Infectious Diseases, 16(6): 555–562.

Asmah, N., 2022, Molecular aspects of *Enterococcus faecalis* virulence, *JDS*, 5(2): 89-94.

Astria, N., Subiyanto, A., & Mooduto, L., 2019, Daya bunuh dan daya hambat antimikrobial chlorhexidine 2% dan povidone iodine 1% sebagai medikamen saluran akar terhadap *Enterococcus faecalis* (the ability of chlorhexidine 2% and povidone iodine 1% as root canal medicaments to kill and inhibit *Enterococcus faecalis*), *CDJ*, 7(1): 12-17.

Augustine, S.K., Bhavsar, S.P., Kapadnis, B.P., 2005, A non-polyene antifungal antibiotic from *Streptomyces albidoflavus* PU 23, *J Biosci.*, 30(2):201–211.

Azman, A.S., Mawang, C.I., Khairat, J.E., AbuBakar, S., 2019, Actinobacteria—a promising natural source of anti-biofilm agents, *Int. Microbiol.*, 22: 403–409.

Barka, E. A., Vatsa, P., Sanchez, L., Gaveau-Vaillant, N., Jacquard, C., Klenk, H.-P., Clément, C., Ouhdouch, Y., & van Wezel, G. P., 2016, Taxonomy, physiology, and natural products of *Actinobacteria*. *Microbiol Mol Biol Rev*, 80(1): 1–43.

Barnes, A.M.T., Ballering, K.S., Leibman, R.S., Wells, C.L., & Dunny, G.M., 2012, *Enterococcus faecalis* produces abundant extracellular structures containing dna in the absence of cell lysis during early biofilm formation. *mBio*, 3(4): e00193-12.

Beloin, C., Houry, A., Froment, M., Ghigo, J., & Henry, N., 2008, A short–time scale colloidal system reveals early bacterial adhesion dynamics. *Plos Biol.*, 6(7): e167.

Bensalem, K., Djeribil, R., & Baena, F.J.L., 2014, Effect of N-acyl homoserine lactones (AHLs) quorum sensing signal molecules on *Enterococcus faecalis* biofilm formation, *Afr. J. Microbiol. Res*., 8(34): 3144–3149.

Blake A, Tuttle T, McKinney R., 2024, *Apical Periodontitis* [Updated 2023 Jul 17) In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing.

Brilian, M.E., Tandelilin, R.T.C., Haniastuti, T., Jonarta, A.L., Yulianto, H.D.K., 2020, Hidrofobisitas bakteri *Pseudomonas aeruginosa* ATCC 10145 setelah dipapar dengan ekstrak lidah buaya (*Aloe vera*), *MKGK*, 8(2): 73-80.

Burnham J. P., 2021, Climate change and antibiotic resistance: a deadly combination. *Ther Adv Infect Dis*., 8: 2049936121991374.

Butt, S., Badshah, Y., Shabbir, M., Rafiq, M,, 2020, Molecular docking using chimera and autodock vina software for nonbioinformaticians, *JMIR Bioinform Biotech*, 1(1):e14232.

Cavalla, F., Letra, A., Silva, R., & Garlet, G., 2021, Determinants of periodontal/periapical lesion stability and progression. *J Dent Res*., 100(1): 29-36.

Chamikara, P., 2016, Advanced Study on selected taxonomic groups of Bacteria and Archaea: *Actinomycetes*. 2016: 1-9.

Chang, F.Y., Ternei, M.A., Calle, P.Y., Brady, S.F., 2015, Targeted metagenomics: finding rare tryptophan dimer natural products in the environment. *J Am Chem Soc*., 137(18):6044-52.

Charousová, I., Medo, J., Hleba, L., Císarová, M., Javoreková, S., 2019, Antimicrobial activity of *Actinomycetes* and characterization of actinomycin-producing strain KRG-1 isolated from Karoo, South Africa, *Braz. J. Pharm. Sci*. 55: e17249:1-11.

Chaudhary, H. S., Yadav, J., Shrivastava, A. R., Singh, S., Singh, A. K., & Gopalan, N., 2013, Antibacterial activity of *Actinomycetes* isolated from different soil samples of Sheopur (A city of central India). *J Adv Pharm Technol Res*., 4(2): 118–123.

Chen, L., Bu, Q., Xu, H., Liu, Y., She, P., Tan, R., Wu, Y., 2016, The effect of berberine hydrochloride on *Enterococcus faecalis* biofilm formation and dispersion in vitro. *Microbiol Res*., 186-187: 44–51.

Choi, S.H., Son, M.J., Kim, S.H., Choi, S.Y., Lee, Y.H., Choi, J.E., An, G., 2009, Isolation and medium development of the *Actinomycetes*, *Streptomyces griseofuscus* CNU-A91231, inhibiting phytopathogenic fungi. *Korean J Microbiol Biotechnol*, 37(4):322–32.

Clinical and Laboratory Standards Institute, 2020, *Performance Standards for Antimicrobials Susceptibility Testing*: *CLSI Supplement M100*, 30 Ed., CLSI, Wayne, PA.

Costa, E.M., Silva, S., Pina, C., Tavaria, F.K., Pintado, M., 2014, Antimicrobial effect of chitosan against periodontal pathogens biofilms, *SOJ Microbiol Infect Dis*, 2(1)*:* 1-6.

Davies, D. G., & Marques, C. N. H., 2009, A fatty acid messenger is responsible for inducing dispersion in microbial biofilms. *J Bacteriol*., 191(5): 1393–1403.

Dioguardi, M., Di Gioia, G., Illuzzi, G., Arena, C., Caponio, V. C. A., Caloro, G. A., Zhurakivska, K., Adipietro, I., Troiano, G., & Lo Muzio, L., 2019, Inspection of the microbiota in endodontic lesions, *Dent. J.*, 7(2):47.

Enersen, M., Nakano, K., & Amano, A., 2013, *Porphyromonas gingivalis* fimbriae, *J Oral Microbiol*., 5(20265): 1-10.

Folcher, M., Gaillard, H., Nguyen, L. T., Nguyen, K. T., Lacroix, P., Bamas-Jacques, N., Rinkel, M., & Thompson, C. J., 2001, Pleiotropic functions of a *Streptomyces pristinaespiralis* autoregulator receptor in development, antibiotic biosynthesis, and expression of a superoxide dismutase. *J Biol Chem*., 276(47): 44297–44306.

Friedman, N. D., Temkin, E., & Carmeli, Y., 2016, The negative impact of antibiotic resistance, *Clin Microbiol Infect*., *22*(5): 416–422.

Gebeyehu, E., Bantie, L., & Azage, M., 2015, Inappropriate use of antibiotics and its associated factors among urban and rural communities of Bahir Dar City Administration, Northwest Ethiopia. *PLoS One*, 10(9): e0138179.

Gebreyohannes, G., Moges, F., Sahile, S., Raja, N., 2013, Isolation and characterization of potential antibiotic producing *Actinomycetes* from water and sediments of Lake Tana, Ethiopia, *Asian Pac J Trop Biomed*. 3(6):426-435.

Gerits, E., Verstraeten, N., Michiels, J., 2017, New approaches to combat *Porphyromonas gingivalis* biofilms, *J. Oral Microbiol.,* Vol. 9: 1-11 (1300366).

Ghaly, M. F., Albalawi, M. A., Bendary, M. M., Shahin, A., Shaheen, M. A., Abu Eleneen, A. F., Ghoneim, M. M., Elmaaty, A. A., Elrefai, M. F. M., Zaitone, S. A., & Abousaty, A. I., 2023, *Tamarindus indica* extract as a promising antimicrobial and antivirulence therapy. *Antibiotics*, 12(3): 464.

Grasso, L.L., Martino, D.C., Alduina, R., 2016, Production of Antibacterial Compounds from *Actinomycetes in* Actinobacteria-Basics and Biotechnological Applications, IntechOpen:177-198.

Guilhen, C., Forestier, C., & Balestrino, D., 2017, Biofilm dispersal: multiple elaborate strategies for dissemination of bacteria with unique properties. *Mol Microbiol*., 105(2): 188–210.

Guiton, P.S., Hung, C.S., Kline, K.A., Roth, R., Kau, A.L., Hayes, E., Heuser, J., Dodson, K.W., Caparon, M.G., & Hultgren, S., 2009, Contribution of autolysin and sortase a during *Enterococcus faecalis* DNA-dependent biofilm development, *Infect Immun*., 77(9): 3626-3638.

Guo, Y., Wei, C., Liu, C., Li, D., Sun, J., Huang, H., Zhou, H., 2015, Inhibitory effects of oral *Actinomyces* on the proliferation, virulence and biofilm formation of *Candida albicans. Arch. Oral Biol.* 60(9): 1368–1374.

Handayani, I., Ratnakomala, S., Lisdiyanti, P., Fahrurrozi, Alanjary, M., Wohlleben, W., & Mast, Y., 2018, Complete Genome sequence of *Streptomyces* sp. Strain BSE7F, a Bali mangrove sediment Actinobacterium with antimicrobial activities, *Genome Announc.,* 6(26): e00618-18.

Hanifeh, M., Spillmann, T., Huhtinen, M., Sclivagnotis, Y., Grönthal, T., & Hynönen, U., 2021, Ex-vivo adhesion of *Enterococcus faecalis* and *Enterococcus faecium* to the intestinal mucosa of healthy beagles. *Animals*, 11(11): 3283.

Hayakawa, M., Nonomura, H., 1989, A new method for the intensive isolation of *Actinomycetes* from soil, *Actinomycetologica*, 3 : 95–104.

He, Q., Hou, Q., Wang, Y., Li, J., Li, W., Kwok, L., Sun, Z., Zhang, H., & Zhong, Z., 2019, Comparative genomic analysis of *Enterococcus faecalis*: insights into their environmental adaptations. *BMC Genomics*, 19: 527.

Herdini, C., Mubarika, S., Hariwiyanto, B., Wijayanti, N., Hosoyama, A., Yamazoe, A., Nojiri, H. and Widada, J., 2017. Secondary bioactive metabolite gene clusters identification of anticandida-producing *Streptomyces* sp. GMR22 isolated from Wanagama forest as revealed by genome mining approach, *Indonesian J. Pharm*., 28(1):.26-33.

Holt, S.C., Kesavalu, L., Walker, S., Genco, C.A., 1999, Virulence factors of *Porphyromonas gingivalis, Periodontol 2000*, 20:168-238.

How, K.Y., Song, K.P., Chan, K.G., 2016, *Porphyromonas gingivalis*: An overview of periodontopathic pathogen below the gum line. *Front Microbiol*., 7(53):1-14.

Huang, R., Li, M., Gregory, R.L., 2011, Bacterial interactions in dental biofilm, *Virulence*, 2(5): 435-444.

Hussein, H. H., Abood, F. M., & Alhelal, A. G., 2020, Some virulence factors of *Enterococcus Faecalis* isolated from root canal infections combined with effect of some irrigation solution against *E.Faecalis*. *Sys Rev Pharm.*, 11(6): 742–748.

Jakovljevic, A., Nikolic, N., Jacimovic, J., Pavlovic, O., Milicic, B., Beljic-Ivanovic, K., Miletic, M., Andric, M., & Milasin, J., 2020, Prevalence of Apical Periodontitis and Conventional Nonsurgical Root Canal Treatment in General Adult Population: An Updated Systematic Review and Meta-analysis of Cross-sectional Studies Published between 2012 and 2020, *J. Endod*., 46(10): 1371–1386.

Jakubiec-Krzesniak, K., Rajnisz-Mateusiak, A., Guspiel, A., Ziemska, J., & Solecka, J., 2018, Secondary metabolites of actinomycetes and their antibacterial, antifungal and antiviral properties, *Pol J Microbiol*., 67(3): 259–272.

Jalaluldeen, A. M., Sijam, K., Othman, R., Abidin, Z., & Ahmad, M., 2015, Growth characteristics and production of secondary metabolites from selected streptomyces species isolated from the Rhizosphere of Chili Plant. *IJERSTE* , 4(1):1-8.

Jia, L., Han, N., Du, J., Guo, L., Luo, Z., & Liu, Y., 2019, Pathogenesis of Important Virulence Factors of *Porphyromonas gingivalis* via Toll-Like Receptors. *Front Cell Infect Microbiol*., 9: 262 (1-16).

Jiao, W., Zhang, F., Zhao, X., Hu, J., Suh, J.W., 2013, A novel alkaloid from marine-derived *Actinomycete Streptomyces xinghaiensis* with broad-spectrum antibacterial and cytotoxic activities, *PLoS One*, 8(10): 1-7.

Jiao, Y. L., Wang, S. J., Lv, M. S., Jiao, B. H., Li, W. J., Fang, Y. W., & Liu, S., 2014, Characterization of a marine-derived dextranase and its application to the prevention of dental caries. *J Ind Microbiol Biotechnol*, 41(1):17-26.

Jin, X., Zhou, J., Richey, G., Wang, M., Choi Hong, S. M., & Hong, S. H., 2021, Undecanoic acid, lauric acid, and N-tridecanoic acid inhibit *Escherichia coli* persistence and biofilm formation. *Journal of Microbiology and Biotechnology*, 31(1): 130–136.

Kamarudheen, N., & Rao, K. V. B. (2019). Fatty acyl compounds from marine Streptomyces griseoincarnatus strain HK12 against two major bio-film forming nosocomial pathogens; an in vitro and in silico approach. *Microbial Pathogenesis*, 127: 121–130.

Kartika, A.N., 2023, Upaya kemandirian bahan baku obat dalam pengembangan industri farmasi di Indonesia, *BIMFI*, 10(1): 21-32.

Kayaoglu, G., & Ørstavik, D., 2004, Virulence factors of *Enterococcus faecalis*: relationship to endodontic disease. *Crit Rev Oral Biol Med*., 15(5): 308–320.

Kementerian Kesehatan Republik Indonesia, 2019, *Laporan Nasional Riskesdas 2018*, Lembaga Penerbit Badan Penelitian dan Pengembangan Kesehatan, Jakarta.

Kementrian Perindustrian Republik Indonesia, 2021, Ringkasan eksekutif ekspor impor industri pengolahan non migas, 1-11. https://kemenperin.go.id/download /26751/Laporan-Ekspor-ImporHasil-Pengolahan-2021-Juli.

Khadke, S. K., Lee, J. H., Kim, Y. G., Raj, V., & Lee, J., 2021, Assessment of antibiofilm potencies of nervonic and oleic acid against acinetobacter

baumannii using in vitro and computational approaches. *Biomedicines*, 9(9):1133.

Khalifa, L., Shlezinger, M., Beyth, S., Houri-Haddad, Y., Coppenhagen-Glazer, S., Beyth, N., & Hazan, R., 2016, Phage therapy against *Enterococcus faecalis* in dental root canals, *J. Oral Microbiol*.: 8(1): 32157(1-11).

Khalighinejad, N., Aminoshariae, M. R., Aminoshariae, A., Kulild, J. C., Mickel, A., & Fouad, A. F., 2016, Association between Systemic Diseases and Apical Periodontitis, *J Endod*., 42(10): 1427–1434,

Khattab, A. I., Babiker, E. H., & Saeed, H. A., 2016. Streptomyces: isolation, optimization of culture conditions and extraction of secondary metabolites. *International Current Pharmaceutical Journal*, 5(3): 27–32.

Kim, Y. R., & Sang, M. K., 2023, Effects of di-(2-ethylhexyl) phthalate on growth, metabolism, and virulence of the plant pathogenic bacterium *Acidovorax citrulli*. *Front Cell Infect Microbiol*., 13: 1228713.

Kitano, T., Mikami, Y., Iwase, T., Asano, M., Komiyama, K., 2016, Loop-mediated isothermal amplification combined with PCR and immunohistochemistry for detecting Porphyromonas gingivalis in periapical periodontitis, *J Oral Sci*., 58(2):163-169.

Klapschinski, T. A., Rabe, P., & Dickschat, J. S., 2016, Pristinol, a Sesquiterpene Alcohol with an Unusual Skeleton from Streptomyces pristinaespiralis. *Angew Chem Int Ed Engl*., 55(34): 10141–10144.

Kouidhi, B., Zmantar, T., Mahdouani, K., Hentati, H., & Bakhrouf, A., 2011, Antibiotic resistance and adhesion properties of oral *Enterococci* associated to dental caries. *BMC Microbiol*., 11: 155.

Krieg, N.R., Staley, J.T., Brown, D.R., Hedlund, B.P., Paster, B.J., Ward, N.L., *et al*., 2010, *Bergey's Manual® of Systematic Bacteriology Second Edition*, Volume 4, Springer, Athens.

Kuang, X., Chen, V., Xu, X., 2018, Novel Approaches to the Control of Oral Microbial Biofilms, *Biomed Res Int*., 2018: 1-13. 6498932.

Kugaji, M.S., Kumbar, V.M., Peram, M.R., Patil, S., Bhat, K.G., Diwan, P.V., 2019, Effect of resveratrol on biofilm formation and virulence factor gene expression of *Porphyromonas gingivalis* in periodontal disease, *APMIS*, 127(4):187-195.

Kumar, P., Lee, J. H., Beyenal, H., & Lee, J., 2020, Fatty Acids as Antibiofilm and Antivirulence Agents. In *Trends in Microbiology*, 28(9): 753–768.

Kumbar, V.M., Peram, M.R., Kugaji, M.S., Shah, T., Patil, S.P., Muddapur, U.M., *et al*., 2020, Efect of curcumin on growth, bioflm formation and virulence factor gene expression of *Porphyromonas gingivalis*. [published online ahead of print, 2020 Apr 11]. *Odontology*, 10.1007/s10266-020-00514-y.

Kurnianto, M., Kusumaningrum, H., & Lioe, H., 2020, Characterization of *Streptomyces* isolates associated with estuarine fish chanos chanos and profiling of their antibacterial metabolites-crude-extract, *International Journal of Microbiology*, 2020: 1-12.

Lee, J. H., Kim, Y. G., Lee, K., Kim, C. J., Park, D. J., Ju, Y., *et al*., 2016, *Streptomyces*-derived Actinomycin D inhibits biofilm formation by *Staphylococcus aureus* and its hemolytic activity, *Biofouling*, 32(1), 45–56.

Lee, J. H., Kim, Y. G., Shim, S. H., & Lee, J., 2017, Antibiofilm activities of norharmane and its derivatives against *Escherichia coli* O157:H7 and other bacteria. *Phytomedicine*, 36: 254–261.

Lee, L.H., Zainal, N., Azman, A.S., Eng, S.K., Goh, B.H., Yin, W.F., Ab Mutalib, N. S., Chan, K. G., 2014, Diversity and antimicrobial activities of *Actinobacteria* isolated from tropical mangrove sediments in Malaysia, *Sci. World J.,* 2014: 698178.

Li, S., Chan, K. K. wan, Hua, M. Z., Gölz, G., & Lu, X., 2022, Inhibition of AI-2 quorum sensing and biofilm formation in *Campylobacter jejuni* by decanoic and lauric acids. *Front Microbiol*., 12: 811506.

Liu, R. H., Shang, Z. C., Li, T. X., Yang, M. H., & Kong, L. Y., 2017, In vitro antibiofilm activity of eucarobustol E against *Candida albicans*. *Antimicrobial Agents and Chemotherapy*, 61(8).

Low, C. F., Shamsir, M. S., Mohamed-Hussein, Z. A., & Baharum, S. N., 2019, Evaluation of potential molecular interaction between quorum sensing receptor, LuxP and grouper fatty acids: In-silico screening and simulation. *PeerJ*, 7: e6568.

Lu, L., Wang, J., Wang, C., Zhu, J., Wang, H., Liao, L., Zhao, Y., Wang, X., Yang, C., He, Z., & Li, M. (2024). Plant-derived virulence arresting drugs as novel antimicrobial agents: Discovery, perspective, and challenges in clinical use. *Phytother Res*., 38(2): 727–754.

Lu, S., Wang, J., Sheng, R., Fang, Y., & Guo, R., 2020, Novel bioactive polyketides isolated from marine *Actinomycetes*: an update review from 2013 to 2019. *Chem Biodivers*., 17(12): e2000562.

Ma, L., Wang, X., Liu, H., Jiang, C., Liao, H., Xu, S., Guo, Y., & Cao, Z., 2019, CXXC5 Mediates *P. gingivalis*-suppressed Cementoblast Functions Partially via MAPK Signaling Network. *Int J Biol Sci*., 15(8): 1685–1695.

Madigan, M.T., Martinko, J.M., Bender, K.S., Buckley, D.H., Stahl, D.A., Brock, T., 2015, *Brock Biology of Microorganisms*, 14th Ed., ISBN-13: 9780321897398.

Marguier, A., Poulin, N., Soraru, C., Vonna, L., Hajjar-Garreau, S., Kunemann, P., & Ploux, L., 2020, Bacterial colonization of low-wettable surfaces is driven by culture conditions and topography. *Advanced Materials Interfaces*, 7(20): 2000179.

Martínez, E., Cosnahan, R. K., Wu, M., Gadila, S. K., Quick, E. B., Mobley, J. A., & Campos-Gómez, J., 2019, Oxylipins mediate cell-to-cell communication in *Pseudomonas aeruginosa*. *Commun Biol* , 2(1): 66.

Meirinhos, J., Martins, J. N. R., Pereira, B., Baruwa, A., Gouveia, J., Quaresma, S. A., Monroe, A., & Ginjeira, A., 2020, Prevalence of apical periodontitis and its association with previous root canal treatment, root canal filling length and type of coronal restoration - a cross-sectional study, *Int Endod J*., 53(4): 573–584.

Melinda, Y. N., Widada, J., Wahyuningsih, T. D., Febriansah, R., Damayanti, E., & Mustofa, M., 2021, Metabologenomics approach to the discovery of novel compounds from Streptomyces sp. GMR22 as anti-SARS-CoV-2 drugs. *Heliyon*, *7*(11).

Meroueh, S., Bencze, K., Hesek, D., Lee, M., Fisher, J., Stemmler, T., & Mobashery, S., 2006, Three-dimensional structure of the bacterial cell wall peptidoglycan. *Proceedings of the National Academy of Sciences*, 103(12), 4404-4409.

Miller, T., Waturangi, D. E., Yogiara., 2022, Antibiofilm properties of bioactive compounds from Actinomycetes against foodborne and fish pathogens, *Scientific Reports*, 12(1): 18614.

Mohamed, H., Miloud, B., Zohra, F., García-Arenzana, J.M., Veloso, A., Rodríguez-Couto, S., 2017, Isolation and characterization of Actinobacteria from Algerian Sahara soils with antimicrobial activities. *Int J Mol Cell Med*., 6(2):109-120.

Munir, A., Umer, H.M., Sabri, A.S., Sajid, I., 2018, In-vitro growth inhibition and biofilm dispersion of caries causing *Streptococcus mutans* by the natural extracts of soil *Streptomyces*. *Pakistan J. Zool*., Vol. 50(4): 1443-1452.

Nagano, K., Hasegawa, Y., Yoshida Y, Yoshimura F, 2017, Novel fimbrilin PGN_1808 in *Porphyromonas gingivalis*, *PLoS One*, 12(3): e0173541.

Nair P. N., 2006, On the causes of persistent apical periodontitis: a review, *Int Endod J.,* 39(4): 249–281.

Nicol, M., Alexandre, S., Luizet, J. B., Skogman, M., Jouenne, T., Salcedo, S. P., & Dé, E., 2018, Unsaturated fatty acids affect quorum sensing communication system and inhibit motility and biofilm formation of Acinetobacter baumannii. *Int J Mol Sci*., 19(1): 214.

Nirwati, H., Damayanti, E., Sholikhah, E. N., Mutofa, M., & Widada, J., 2022, Soil-derived Streptomyces sp. GMR22 producing antibiofilm activity against Candida albicans: bioassay, untargeted LC-HRMS, and gene cluster analysis. *Heliyon*, *8*(4).

Nithyanand, P., Thenmozhi, R., Rathna, J., Pandian, S.K., 2010, Inhibition of *Streptococcus pyogenes* biofilm formation by coral-associated *Actinomycetes*, *Curr Microbiol*., 60(6):454–460.

Oh, J. K., Yegin, Y., Yang, F., Zhang, M., Li, J., Huang, S., Verkhoturov, S. V., Schweikert, E. A., Perez-Lewis, K., Scholar, E. A., Taylor, T. M., Castillo, A., Cisneros-Zevallos, L., Min, Y., & Akbulut, M., 2018, The influence of surface chemistry on the kinetics and thermodynamics of bacterial adhesion. *Sci Rep*., 8(1): 17247.

Oh, JH., Jeong , Y.J., Koo, H.J., Park, D.W., Kang, S.C., Khoa, H.V.B., *et al*., 2014, Antimicrobial activities against periodontopathic bacteria of *Pittosporum tobira* and its active compound, *Molecules* 2014, *19*, 3607-3616.

Oja, T., Galindo, P. S. M., Taguchi, T., Manner, S., Vuorela, P. M., Ichinose, K., Metsä-Ketelä, M., & Fallarero, A., 2015, Effective antibiofilm polyketides against *Staphylococcus aureus* from the pyranonaphthoquinone biosynthetic pathways of *Streptomyces* species. *Antimicrobial Agents and Chemotherapy*, *59*(10), 6046–6052.

Oli, A, K., Javaregowda P. K., Jain, A., Kelmani, C.R., 2022, *Mechanism involved in biofilm formation of Enterococcus faecalis: Focus on bacterial biofilms*, IntechOpen.

Pandit, N., Changela, R., Bali, D., Tikoo, P., Gugnani, S., 2015, *Porphyromonas gingivalis* : Its virulence and vaccine, *J Int Clin Dent Res Organ*, 7:51-58.

Peeters, E., Hooyberghs, G., Robijns, S., Weerdt, A., Kucharíková, S., Tournu, H., & Steenackers, H., 2018, An antibiofilm coating of 5-aryl-2-aminoimidazole covalently attached to a titanium surface. *Journal of Biomedical Materials Research Part B Applied Biomaterials*, 107(6): 1908-1919.

Peeters, E., Nelis, H. J., & Coenye, T., 2008, Comparison of multiple methods for quantification of microbial biofilms grown in microtiter plates. *Journal of Microbiological Methods*, 72(2): 157–165.

Pepper, I.L., Gentry, T.J., 2015, Chapter 4: Earth Environments *in* Pepper, I.L., Gerba, C.P., Gentry, T,J. (Editors), Environmental Microbiology, Third Edition: 59-88. Academic Press, ISBN 9780123946263,

Peraturan Menteri Kesehatan Republik Indonesia Nomor 87 Tahun 2013 Peta Jalan Pengembangan Bahan Baku Obat

Pinzi L., Rastelli G., 2019, Molecular docking: shifting paradigms in drug discovery. *Int. J. Mol. Sci.*, 20: 4331.

Preshaw, P.M., 2019, Periodontal Disease Pathogenesis *in* Newman and Carranza's Clinical Periodontology 13 Ed., Elsevier, Philadelpia.

Purbowati, R., Pratiwi, V. M., Masfufatun, M., Tania, P. O. A., & Khumaeni, A., 2023, Antibacterial and antibiofilm effects of gold and silver nanoparticles against the uropathogenic Escherichia coli by scanning electron microscopy (SEM) analysis. *Healthcare in Low-Resource Settings*, 11(2).

Qian, W., Li, X., Liu, Q., Lu, J., Wang, T., & Zhang, Q., 2022, Antifungal and Antibiofilm Efficacy of Paeonol Treatment Against Biofilms Comprising *Candida albicans* and/or *Cryptococcus neoformans*. *Front Cell Infect Microbiol*., 12: 884793.

Raissa, G., Waturangi, D. E., & Wahjuningrum, D., 2020, Screening of antibiofilm and anti-quorum sensing activty of Actinomycetes isolates extracts against aquaculture pathogenic bacteria. *BMC Microbiol*., 20(1): 343.

Rajamanikyam, M., Vadlapudi, V., Parvathaneni, S. P., Koude, D., Sripadi, P., Misra, S., Amanchy, R., & Upadhyayula, S. M., 2017, Isolation and characterization of phthalates from Brevibacterium mcbrellneri that cause cytotoxicity and cell cycle arrest. *EXCLI J.* , 16: 375–387.

Rajendran, R., Abirami, M., Jagadeeswari, S., Prabhavathi, P., 2016, Production, optimization and partial purification of antimicrobial compound from *Streptomyces exfoliates*, *JST*, 2(1): 58-63.

Ratnakomala, S., Apriliana, P., Fahrurrozi, Lisdiyanti, P., Kusharyoto, W., 2016, Aktivitas antibakteri Aktinomisetes laut dari Pulau Enggano [Antibacterial activity of marine *Actinomycetes* from Enggano Island]." *Berita Biologi*, Vol. 15(3):275-283.

Re, B., Sgorbati, B., Miglioli, M., & Palenzona, D., 2000, Adhesion, autoaggregation and hydrophobicity of 13 strains of bifidobacterium longum. *Letters in Applied Microbiology*, 31(6): 438-442.

Reen, F. J., Gutiérrez-Barranquero, J. A., Parages, M. L., & O'Gara, F., 2018, Coumarin: a novel player in microbial quorum sensing and biofilm formation inhibition. *Appl Microbiol Biotechnol*., 102(5): 2063–2073.

Ricciotti, E., & FitzGerald, G. A., 2011, Prostaglandins and inflammation, *Arterioscler Thromb Vasc Biol*., 31(5): 986–1000.

Ricucci, D., & Siqueira, J. F., Jr., 2010, Biofilms and apical periodontitis: study of prevalence and association with clinical and histopathologic findings. *J Endod*., 36(8):1277-1288.

Sabu, R., Soumya, K.R., Radhakrishnan, E.K., 2017, *Endophytic Nocardiopsis* sp. from *Zingiber officinale* with both antiphytopathogenic mechanisms and antibiofilm activity against clinical isolates. 3 *Biotech*.7(115):1-13.

Sáenz, J.P.; Grosser, D.; Bradley, A.S.; Lagny, T.J.; Lavrynenko, O.; Broda, M.; Simons, K., 2015, Hopanoids as functional analogues of cholesterol in bacterial membranes. *Proc. Natl. Acad. Sci. USA.*, 112: 11971–11976.

Saito, H. E., Harp, J. R., & Fozo, E. M., 2014, Incorporation of exogenous fatty acids protects *Enterococcus faecalis* from membrane-damaging agents. *Appl Environ Microbiol*. , 80(20): 6527–6538.

Salem, M.A., Salama, M.M., Ezzat, S.M., & Hashem, Y.A., 2022, Comparative metabolite profiling of four polyphenol rich Morus leaves extracts in relation to their antibiofilm activity against *Enterococcus faecalis*. *Sci Rep*., 12: 20168.

Saryono, Finna, P., Usman, P., Wahyu, P.N., Aulia, A., 2018, Isolation and identification of bacteria and *Actinomycetes* isolated from wilting banana plants (*Musa Sp.*), *IOP Conf. Ser.: Mater. Sci. Eng.,* 532 012028: 1-8.

Saryono, M., Dangi, P., Choudhary, M., 2014, *Actinomycetes*: Source, Identification, and Their Applications, *Int.J.Curr.Microbiol.App.Sci,* 3(2): 801-832.

Sasaki, H., Hirai, K., Martins, C. M., Furusho, H., Battaglino, R., & Hashimoto, K., 2016, Interrelationship Between Periapical Lesion and Systemic Metabolic Disorders, *Curr Pharm Des*., 22(15): 2204–2215.

Sastry, V.M.V.S.; Rao, G.R.K., 1995, Dioctyl phthalate and antibacterial compound from the marine brown algae *Sargassum wightii*. *J. Appl. Phycol*., 7:185-186.

Schleifer, K.H.; Kilpper-Bälz, R. 1984, Transfer of *Streptococcus faecalis* and *Streptococcus faecium* to the genus *Enterococcus* nom. rev. as *Enterococcus faecalis* comb. nov. and E*nterococcus faecium* comb. nov. *nt. J. Sys. Bact.* 34(1): 31-34.

Seguel, N., Quezada-Aguiluz, M., González-Rocha, G., Bello-Toledo, H., & Sánchez-Sanhueza, G., 2020, Antibiotic Resistance of *Enterococcus faecalis* from Persistent Endodontic Infections, *Int. J. Odontostomat*, 14(3): 448-456.

Seipke, R. F., 2015, Strain-level diversity of secondary metabolism in *Streptomyces albus*. *PLoS ONE*, 10(1):e0116457.

Senerovic, L., Opsenica, D., Moric, I., Aleksic, I., Spasić, M., & Vasiljevic, B., 2020, Quinolines and quinolones as antibacterial, antifungal, anti-virulence, antiviral and anti-parasitic agents. *Adv Exp Med Biol*., 1282: 37–69.

Setiawati, S., & Yusan, R. T., 2022, *Actinomycetes* as a source of potential antimicrobial and antibiofilm agents, *Medical and Health Journal*, 1(2): 50.

Setiawati, S., Nuryastuti, T., Sholikhah, E.T., Lisdiyanti, P., Pratiwi, S.U.T., Sulistyani, R., Ratnakomala, S., Jumina, Mustofa, 2021, The potency of

actinomycetes extracts isolated from Pramuka Island, Jakarta, Indonesia as antimicrobial agents, *Biodiversitas,* 22(3): 1104-1111.

Shah, H. N., and Collins, M. D., 1988, Proposal for reclassification of *Bacteroides asaccharolyticus, Bacteroides gingivalis*, and *Bacteroides endodontalis* in a new genus, *Porphyromonas*. *Int. J. Syst. Bacteriol.*, 38: 128–131.

She, P., Wang, Y., Li, Y., Zhou, L., Li, S., Zeng, X., Liu, Y., Xu, L., & Wu, Y., 2021, Drug Repurposing: In vitro and in vivo Antimicrobial and Antibiofilm Effects of Bithionol Against Enterococcus faecalis and Enterococcus faecium. *Frontiers in Microbiology*, *12*.

Shirling, E.B., Gottlieb, D., 1966, Methods for characterization of S*treptomyces* species, *Int J Syst Bacteriol*, 16(3): 313-340.

Siqueira, J. and Rôças, I., 2008, Clinical implications and microbiology of bacterial persistence after treatment procedures, *J Endod*., 34(11):1291-1301.e3.

Siqueira, J. F., Jr, & Rôças, I. N., 2009, Distinctive features of the microbiota associated with different forms of apical periodontitis. *J Oral Microbiol*., 1: 1-12.

Skindersoe, M.E., Alhede, M., Phipps, R., Yang, L., Jensen, P.O., Rasmussen, T.B., *et al*., 2008a, Effects of antibiotics on quorum sensing in *Pseudomonas aeruginosa*, *Antimicrob Agents Chemother*, 52(10): 3648–63.

Skindersoe, M.E., Ettinger-Epstein, P., Rasmussen, T.B., Bjarnsholt, T., De Nys, R., Givskov, M., 2008b, Quorum sensing antagonism from marine organisms, *Mar Biotechnol*, 10(1): 56–63.

Solanki, R., Khanna, M., & Lal, R., 2008, Bioactive compounds from marine *Actinomycetes*. *Indian J Microbiol*., 48(4): 410–431.

Sottorff, I., Wiese, J., Lipfert, M., Preußke, N., Sönnichsen, F. D., & Imhoff, J. F., 2019, Different secondary metabolite profiles of phylogenetically almost identical streptomyces griseus strains originating from geographically remote locations. *Microorganisms*, *7*(6).

Sparo, M. D., Castro, M. S., Andino, P. J., Lavigne, M. V., Ceriani, C., Gutiérrez, G. L., Fernández, M. M., De Marzi, M. C., Malchiodi, E. L., & Manghi, M. A., 2006, Partial characterization of enterocin MR99 from a corn silage isolate of Enterococcus faecalis. *J Appl Microbiol*. 100(1):123-134.

Spiegelman, L., Bahn-Suh, A., Montaño, E. T., Zhang, L., Hura, G. L., Patras, K. A., Kumar, A., Tezcan, F. A., Nizet, V., Tsutakawa, S. E., & Ghosh, P., 2022, Strengthening of enterococcal biofilms by Esp. *PLoS Pathog*., *18*(9): e1010829.

Stefani, R., 2023, Perawatan saluran akar periodontitis apikalis kronis pada gigi insisivus lateral maksilaris kiri, *JKG*T, 5(2): 9-12.

Stenz, L., François, P., Fischer, A., Huyghe, A., Tangomo, M., Hernandez, D., Cassat, J., Linder, P., & Schrenzel, J., 2008, Impact of oleic acid (cis-9-octadecenoic acid) on bacterial viability and biofilm production in Staphylococcus aureus. *FEMS Microbiol Lett*., 287(2): 149–155.

Stuart, C., Schwartz, S., Beeson, T., & Owatz, C., 2006, *Enterococcus faecalis*: Its Role in Root Canal Treatment Failure and Current Concepts in Retreatment, *J. Endod*., 32(2): 93–98.

Su, S., Yin, P., Li, J., Chen, G., Wang, Y., Qu, D., Li, Z., Xue, X., Luo, X., & Li, M., 2020, In vitro and in vivo anti-biofilm activity of pyran derivative against Staphylococcus aureus and Pseudomonas aeruginosa. *Journal of Infection and Public Health*, 13(5): 791–799.

Subramani, R., & Sipkema, D., 2019, Marine Rare *Actinomycetes*: A Promising Source of Structurally Diverse and Unique Novel Natural Products. *Mar Drugs*., 17(5): 249.

Suhartono, S., Soraya, C., & Shabira, P., 2023, Antibiofilm activity of neem leaf (*Azadirachta indica* A. Juss) ethanolic extracts against *Enterococcus faecalis* in vitro. *Dental Journal*, *56*(2), 98–103.

Sutasmi, Y. & Natsir, N., 2014, Identifikasi bakteri pada saluran akar gigi dengan diagnosis periodontitis apikalis kronis (identification of bacteria in dental root canal diagnosed with chronic apicalis periodontitis), *J. dentomaxillofacial sci*., 13(3): 182-185.

Tambunan, T. R., Widada, J., Damayanti, E., Wahyuningsih, T. D., & Mustofa, M., 2020, Antiplasmodial Activity of The Low Molecular Weight Compounds from Streptomyces sp. GMR22. *Indonesian Journal of Pharmacy*, *31*(4), 273-280.

Tamura, T., Miyata, T., Hatori, K., Himi, K., Nakamura, T., Toyama, Y., & Takeichi, O., 2021, Role of S100A4 in the Pathogenesis of Human Periapical Granulomas. *In vivo*, 35(4): 2099–2106.

Tan, H.C.; Cheung, G.S.P.; Chang, J.W.W.; Zhang, C.; Lee, A.H.C., 2022, *Enterococcus faecalis* Shields *Porphyromonas gingivalis* in Dual-Species Biofilm in Oxic Condition. *Microorganisms*, 10(9):1729.

Tanomaru, J., Leonardo, M., Tanomaru-Filho, M., Silva, L., & Ito, I., 2008, Microbial distribution in the root canal system after periapical lesion induction using different methods. *Braz Dent J*., 19(2): 124-129.

Tendolkar, P. M., Baghdayan, A. S., Gilmore, M. S., & Shankar, N., 2004, Enterococcal surface protein, Esp, enhances biofilm formation by *Enterococcus faecalis*. *Infect Immun*., *72*(10), 6032–6039.

Tibúrcio-Machado, C. S., Michelon, C., Zanatta, F. B., Gomes, M. S., Marin, J. A., & Bier, C. A., 2021, The global prevalence of apical periodontitis: a systematic review and meta-analysis. *Int Endod J*., 54(5): 712–735.

Tiwari, K. & Gupta, R.K., 2012, Rare actinomycetes: a potential storehouse for novel antibiotics, *Crit Rev Biotechnol*., 32(2): 108–132.

Tobi, C., Saptarini, O., & Rahmawati, I., 2022, Aktivitas antibiofilm ekstrak dan fraksi-fraksi biji pinang (*Areca catechu L.*) terhadap *Staphylococcus aureus* ATCC 25923. *JPSCR Journal of Pharmaceutical Science and Clinical Research*, 7(1): 56.

Toledo-Arana, A., Valle, J., Solano, C., Arrizubieta, M. J., Cucarella, C., Lamata, M., Amorena, B., Leiva, J., Penadés, J. R., & Lasa, I., 2001, The enterococcal surface protein, Esp, is involved in *Enterococcus faecalis* biofilm formation. *Appl Environ Microbiol*. , 67(10): 4538–4545.

van Winkelhoff, A.J., Gonzales, D.H., Winkel, E.G., Dellemijn-Kippuw, N., Vandenbroucke-Grauls, C.M.J.E., Sanz, M., 2000, Antimicrobial resistance in the subgingival microflora in patients with adult periodontitis. A

comparison between the Netherlands and Spain. *J Clin Periodontol*., 27:79-86.

von Rintelen, K., Arida, E., Häuser, C., 2017, A review of biodiversity-related issues and challenges in megadiverse Indonesia and other Southeast Asian countries, *Research Ideas and Outcomes*, 3: e20860.

Wahyuni, D.S., Sudarwanto, M.B., Lisdiyanti, P., 2014, Screening of antibacterial activities of actinomycetes isolates from Indonesia, *Glob Vet.*,13(03):266–72.

Walker, T.S., Bais, H.P., De´ziel, E., Schweizer, H.P., Rahme, L.G., Fall, R., *et al*., 2004, *Pseudomonas aeruginosa*-plant root interactions. Pathogenicity, biofilm formation, and root exudation, *Plant Physiol*, Vol. 134: 320–331.

Wang, D., Wang, C., Gui, P., Liu, H., Khalaf, S.M.H., Elsayed, E.A., *et al*., 2017, Identification, bioactivity, and productivity of Actinomycins from the marine-derived *Streptomyces heliomycini*, *Front Microbiol*, 8 (1147):1–12.

Wang, H. Y., Cheng, J. W., Yu, H. Y., Lin, L., Chih, Y. H., Pan, Y. P., 2015, Efficacy of a novel antimicrobial peptide against periodontal pathogens in both planktonic and polymicrobial biofilm states, *Acta Biomater*., 25: 150–161.

Wang, J., Nong, X.H., Amin, M., Qi, S.H., 2018, Hygrocin C frommarine-derived *Streptomyces sp.* SCSGAA 0027 inhibits biofilm formation in *Bacillus amyloliquefaciens* SCSGAB0082 isolated from South China Sea gorgonian, *Appl. Microbiol. Biotechnol*, 102:1417–1427.

Wang, Q. Q., Zhang, C. F., Chu, C. H., & Zhu, X. F., 2012,. Prevalence of Enterococcus faecalis in saliva and filled root canals of teeth associated with apical periodontitis. *International Journal of Oral Science*, 4(1): 19–23.

Waturangi, D.E., Rahayu, B.S., Lalu, K.Y., Michael, Mulyono, N., 2016, Characterization of bioactive compound from *Actinomycetes* for antibiofilm activity against Gram-negative and Gram-positive bacteria, *Malays J Microbiol*., Vol 12(4): 291-299.

Wen, Y., Luo, Y., Wei, X., Tan, H., Ai, R., Xiong, Z., & Ye, L., 2022, Antibacterial effects of liquid discharge cold plasma on *Enterococcus faecalis* planktonic cultures and biofilms: an in vitro study of root canal treatment, *Journal of Physics D Applied Physics*, 55(36): 365204.

Wen, Y.; Zhang, G.; Bahadur, A.; Xu, Y.; Liu, Y.; Tian, M.; Ding, W.; Chen, T.; Zhang, W.; Liu, G., 2022, Genomic investigation of desert *Streptomyces huasconensis* D23 reveals its environmental adaptability and antimicrobial activity. *Microorganisms*, 10(12): 2408.

Widada, J., Damayanti, E., Mustofa, 2021, Complete Genome Sequence of the Marine-Derived Bacterium *Streptomyces* sp. Strain GMY02. *Microbiol Resour Announc*., 10(40): e0068121.

Windaryanti, D., Gabriel, C. S., Hidayat, I. W., Zainuddin, A., Dharsono, H. D. A., Satari, M. H., & Kurnia, D., 2022, The Potential of 24-Propylcholestrol as Antibacterial Oral Bacteria of Enterococcus faecalis ATCC 29212 and Inhibitor Biofilms Formation: in vitro and in silico Study. *Advances and Applications in Bioinformatics and Chemistry*, *15*, 99–111.

Wong, J., Manoil, D., Näsman, P., Belibasakis, G. N., & Neelakantan, P., 2021, Microbiological Aspects of Root Canal Infections and Disinfection

Strategies: An Update Review on the Current Knowledge and Challenges, *Front. Oral. Health*, Vol. 2: 1-19 (672887).

Wu, Z., Li, S., Li, J., Chen, Y., Saurav, K., Zhang, Q., *et al*., 2013, Antibacterial and cytotoxic new napyradiomycins from the marine-derived *Streptomyces sp.* SCSIO 10428, *Mar Drugs*, 11(6): 2113–2125.

Xie, T. T., Zeng, H., Ren, X. P., Wang, N., Chen, Z. J., Zhang, Y., & Chen, W., 2019, Antibiofilm activity of three *Actinomycete* strains against *Staphylococcus epidermidis. Lett Appl Microbiol*, 68(1): 73–80.

Xu, D. B., Ye, W. W., Han, Y., Deng, Z. X., & Hong, K., 2014, Natural products from mangrove *Actinomycetes*. *Marine drugs*, 12(5): 2590–2613.

Xu, X., Chen, F., Huang, Z., Ma, L., Chen, L., Pan, Y., *et al.*, 2018, Meeting report: a close look at oral biofilms and microbiomes, *Int. J. Oral Sci.*, 10 (28): 1-5.

Yang, H., Singh, M., Kim, S. J., & Schaefer, J., 2017, Characterization of the tertiary structure of the peptidoglycan of *Enterococcus faecalis*, *Biochim Biophys Acta Biomembr*., 1859(11): 2171–2180.

Ye, L., Cao, L., Song, W., Yang, C., Tang, Q., & Yuan, Z., 2023, Interaction between apical periodontitis and systemic disease (Review), *Int. J. Mol. Med*., 52(1): 60.

Ye, Z. and Aparicio, C., 2021, Interactions of two enantiomers of a designer antimicrobial peptide with structural components of the bacterial cell envelope. *J Pept Sci*., 28(1): e3299.

Younis, K.M., Usup, G., Ahmad, A., 2016, Secondary metabolites produced by marine streptomyces as antibiofilm and quorum-sensing inhibitor of uropathogen *Proteus mirabilis*, *Environ Sci Pollut Res*., 23(5):4756–67.

Yu, M., Kim, M., Rosa, V., Hwang, Y., Fabbro, M., Sohn, W., & Min, K., 2019, Role of extracellular dna in enterococcus faecalis biofilm formation and its susceptibility to sodium hypochlorite. *Journal of Applied Oral Science*, 27: e20180699.

Yulianto, H., & Morita, 2014, Potensi herbal buah mahkota dewa (phaleria macrocarpa (scheff.) boerl) yang dimanfaatkan sebagai modifikator permukaan dan anti-adhesi bakteri s.mutans pada permukaan material restorasi resin komposit. *Dentika Dental Journal*, 18(2), 158-164.

Yunus, B., 2022, Prevalence of chronic apical periodontitis during the Covid-19 pandemic period at Dental Hospital of Hasanuddin University: intraoral radiographic study, *MDJ*, 11(3): 295-298.

Yuyama, K. T., Rohde, M., Molinari, G., Stadler, M., & Abraham, W. R., 2020, Unsaturated fatty acids control biofilm formation of *Staphylococcus aureus* and other gram-positive bacteria. *Antibiotics*, 9(11): 1–11.

Zeng, X., She, P., Zhou, L., Li, S., Hussain, Z., Chen, L., & Wu, Y., 2021, Drug repurposing: Antimicrobial and antibiofilm effects of penfluridol against *Enterococcus faecalis*. *MicrobiologyOpen*, 10(1).

Zhang, L., Liu, Z., Wang, Y., Zhang, J., Wan, S., Huang, Y., Yun, T., Xie, J., & Wang, W., 2022, Biocontrol Potential of Endophytic *Streptomyces malaysiensis* 8ZJF-21 From Medicinal Plant Against Banana Fusarium Wilt Caused by *Fusarium oxysporum* f. sp. *cubense* Tropical Race 4. *Front Plant Sci*., 13: 874819.

Zhao, L., Duan, F., Gong, M., Tian, X., Guo, Y., Jia, L., & Deng, S., 2021, (+)-Terpinen-4-ol Inhibits *Bacillus cereus* Biofilm Formation by Upregulating the Interspecies Quorum Sensing Signals Diketopiperazines and Diffusing Signaling Factors. *J Agric Food Chem*., 69(11): 3496–3510.

Zheng, J., Wu, Y., Lin, Z., Pu, Z., Yao, W., Chen, Z., Li, D., Deng, Q., Qu, D., & Yu, Z., 2017, Characteristics of and virulence factors associated with biofilm formation in clinical *Enterococcus faecalis* isolates in china. *Frontiers in Microbiology*, 8: 8:2338.

Zita, A. and Hermansson, M., 2006, Determination of bacterial cell surface hydrophobicity of single cells in cultures and in wastewater in situ. *Fems Microbiology Letters*, 152(2), 299-306.

Zita, A., & Hermansson, M., 1997, Effects of bacterial cell surface structures and hydrophobicity on attachment to activated sludge flocs, *Appl. Environ. Microbiol*., 63(3): 1168–1170.

Zoletti, G. O., Pereira, E. M., Schuenck, R. P., Teixeira, L. M., Siqueira, J. F., & dos Santos, K. R. N., 2011, Characterization of virulence factors and clonal diversity of *Enterococcus faecalis* isolates from treated dental root canals, *Res. Microbiol.*, 162(2): 151–158.