

DAFTAR PUSTAKA

- Acharya, A. 2023. Development and application of SEM/EDS in biological, biomedical and nanotechnological research. *arXiv preprint*. doi:10.48550/arXiv.2311.00667.
- Afonso, A.C., Oliveira, D., Saavedra, M.J., Borges, A., and Simoes, M., 2021, Biofilms in diabetic foot ulcers: impact risk factors and control strategies, *IJMS*, **22**: 8278.
- Ajane, G. and Patil, A.S. 2019, Evaluation of antioxidant potential of *Passiflora foetida* L. extract and quantitative evaluation of its phytochemical content-a possible natural antioxidant, *Pharm Chem J*, **6**: 14-24.
- Akbariqomi, M., Ghafourian, S., Taherikalani, M., Mohammadi, S., Pakzad, I. and Sadeghifard, N. 2015. Antibiotic Susceptibility Patterns of Extended Spectrum β -lactamase and non-Extended Spectrum β -lactamase *Pseudomonas aeruginosa* Clinical Isolates. *Recent Patents on Anti-Infective Drug Discovery*. **10(2)**: 128–133. doi:10.2174/1574891X10666150901111312
- Alexiadou K. and Doupis J. 2012, Management of diabetic foot ulcers. *Diabetes Ther*, **3(1)**: 4.
- Alhariri, M., Majrashi, M. A., Bahkali, A. H., Almajed, F. S., Azghani, A. O., Khyami, M. A., Alyamani, E. J., Aljohani, S. M., and Halwani, M. A. 2017, Efficacy of neutral and negatively charged liposome-loaded gentamicin on planktonic bacteria and biofilm communities, *International Journal of Nanomedicine*, **12(18)**: 6949–6961.
- Aliviyan, Y., Sudibyo, R. S., dan Murwanti, R. 2021, Efek sitotoksik beberapa akar bajakah Kalimantan terhadap sel kanker payudara T47D, *Jurnal Penelitian Saintek*, **26(2)**: 131–140.
- Al-Joufi, F.A., Aljarallah, K.M., Hagra, S.A., Al Hosiny, I.M., Salem-Bekhit, M.M., Youssof, A.M.E. and Shakeel, F. 2020. Microbial spectrum, antibiotic susceptibility profile, and biofilm formation of diabetic foot infections (2014–18): a retrospective multicenter analysis. *3 Biotech*. **10(325)**: 1–9. <https://doi.org/10.1007/s13205-020-02318-x>
- Allen, O.N. and Allen, E.K. 1981, *The Leguminosae, a Source Book of Characteristics, Uses, and Nodulation*, Univ. of Wisconsin Press, Madison.
- Alves, F.R.F., Neves, M.A.S., Silva, M.G., Rocas, I.N. and Siqueira Jr., J.F. 2013. Antibiofilm and antibacterial activities of farnesol and xylitol as potential endodontic irrigants. *Braz Dent J*. **24(3)**: 224–229. <https://doi.org/10.1590/0103-6440201302187>
- Ammons, M.C.B., Ward, L.S., Dowd, S. and James, G.A. 2011. Combined treatment of *Pseudomonas aeruginosa* biofilm with lactoferrin and xylitol inhibits the ability of bacteria to respond to damage resulting from lactoferrin iron chelation. *Int J Antimicrob Agents*. **37(4)**: 316–323. <https://doi.org/10.1016/j.ijantimicag.2010.12.019>

- Anandan, R., Jayakar, B., Jeganathan, S., Manavalan, R., and Kumar, S.R. 2009, Effect of ethanol extract of fruits of *Passiflora foetida* L. Linn. on CCl₄, *J Pharm Res*, **2**: 413-5.
- Anisa, S., Wydiamala, E., and Hayatie, L. 2022, Efektivitas ekstrak etanol akar bajakah merah (*Spatholobus littoralis* Hassk) Sebagai antimalaria secara *in vitro* terhadap *Plasmodium falciparum*, *Homeostasis*, **5(1)**: 151–160.
- Anjum, A., Chung, P.Y. and Ng, S.F. 2019. PLGA/xylitol nanoparticles enhance antibiofilm activity via penetration into biofilm extracellular polymeric substances. *RSC Adv*. **9**: 14198–14208. <https://doi.org/10.1039/C9RA00125E>
- Anzano, A., Grauso, L., de Falco, B., and Lanzotti, V. 2025. Untargeted LC-HRMS metabolomics and chemometrics of *Aloe vera* across diverse geographical origins and cultivation practices. *Plants*. **14(11)**:1685.
- Ariesanti, Y. Poedjiastoeti, W., Komariah, Wijaya, A.F. 2021, *In vitro* wound healing potential of stem extract of *Spatholobus littoralis* Hassk. Hassk., *Journal of International Dental and Medical Research*. **14(4)**: 1379-1385.
- Arifin, Y. F., Hamidah, S., and Hatta, G. M. 2021, Comparison of the Flavonoid Contents of Bajakah Plants from Tropical Forest in Kalimantan, Indonesia, *Journal of Hunan University Natural (Natural Sciences)*, **48(8)**: 22–26.
- Armbruster, C.R., Wolter, D.J., Mishra, M., *et al.* 2016. *Staphylococcus aureus* protein A mediates interspecies interactions at the cell surface of *Pseudomonas aeruginosa*. *mBio*. **7(3)**: e00538–16. doi:10.1128/mBio.00538-16.
- Armstrong, D.G., Boulton, A.J.M., and Bus, S.A. 2017, Diabetic foot ulcers and their recurrence, *N Engl J Med.*, **376(24)**: 2367–75.
- Armstrong, D.G., Swerdlow, M.A., and Armstrong, A.A. 2020, Five year mortality and direct costs of care for people with diabetic foot complications are comparable to cancer, *J Foot Ankle Res*, **13**: 16.
- Azeredo, J., Azevedo, N.F., Briandet, R., Cerca, N., Coenye, T., Costa, A.R., Desvaux, M., Di Bonaventura, G., Hébraud, M., Jaglic, Z., Kačániová, M., Knöchel, S., Lourenço, A., Mergulhão, F.J., Meyer, R.L., Nychas, G., Simões, M., Tresse, O., and Sternberg, C., 2017, Critical review on biofilm methods, *Critical Reviews in Microbiology*, **43(3)**: 313–351. <https://doi.org/10.1080/1040841X.2016.1208146>
- Benny, A.T., Thamim, M., Easwaran, N., Gothandam, K.M., Thirumoorthy, K., and Radhakrishnan, E.K. 2024, Attenuation of *quorum sensing* mediated virulence factors and biofilm formation in *Pseudomonas aeruginosa* PAO1 by substituted chalcones and flavonols, *Chemistry & Biodiversity*. **21(8)**: e202400393. <https://doi.org/10.1002/cbdv.202400393>
- Bhalodi, A.A., Oppermann, N., Campeau, S.A., and Humphries, R.M., 2021, Variability of beta-lactam broth microdilution for *Pseudomonas aeruginosa*, *Antimicrobial Agents and Chemotherapy*, **65**: e00640-21.
- Birkenhauer, E., Neethirajan, S. and Weese, J.S. 2014. Collagen and hyaluronan at wound sites influence early polymicrobial biofilm adhesive events. *BMC Microbiol*. **14**: 191. doi:10.1186/1471-2180-14-191
- Birudu, R.B., Naik, J.M., and Janardhan, M. 2015, Cardio protective activity of *Passiflora foetida* extract and silver nanoparticles in doxorubicin induced

- cardiac disease in rats, *Indian Journal of Research in Pharmacy and Biotechnology*, **3(5)**: 329.
- Birudu, R.B., Naik, J.M., Revana, S.D., Jilani, S.K., and Janardhan, M. 2015, Phytochemical screening of ethanolic extract of *Passiflora foetida* L. (Linn) and medicinal importance, *Indian Journal of Research in Pharmacy and Biotechnology*, **3(4)**: 324-327.
- Bonincontro, G., Scuderi, S.A., Marino, A., and Simonetti, G., 2023, Synergistic Effect of Plant Compounds in Combination with Conventional Antimicrobials against Biofilm of *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Candida* spp., *Pharmaceuticals*, **16(11)**: 1531. <https://doi.org/10.3390/ph16111531>
- Boulton A.J.M. and Whitehouse, R.W. 2000, *The Diabetic Foot*, MDText.co Inc, South Darmouth.
- Bozic, D.D., Pavlovic, B., Milovanovic, J., Jotic, A., Colovic, J., and Cirkovic, I. 2018, Antibiofilm effects of amoxicillin–clavulanic acid and levofloxacin in patients with chronic rhinosinusitis with nasal polyposis, *European Archives of Oto-Rhino-Laryngology*, **275**:2051–2059.
- Brodusch, N., Brahim, S.V., De Melo, E.B., Song, J., Yue, S., Piché, N., and Gauvin, R. 2021, Scanning electron microscopy versus transmission electron microscopy for material characterization: a comparative study on high-strength steels, *Scanning*, **2021**:5511618.
- Camara, M., Green, W., MacPhee, C.E., Rakowska, P.D., Rayal, R., and Richardson, M.C. 2022, Economic significance of biofilms: a multidisciplinary and cross-sector challenge, *NPJ Biofilms Microbiomes*, **8**:1-8.
- Carr, J.H., Anderson, R.L. and Favero, M.S. 1996. Comparison of chemical dehydration and critical point drying for the stabilization and visualization of aging biofilm present on interior surfaces of PVC distribution pipe. *J Appl Bacteriol.* **80(2)**: 225–232. doi:10.1111/j.1365-2672.1996.tb03214.x.
- Chabib, L., Hamzah, H., Rahmah, W., Sammulia, S.F., Setyowati, E., and Nurfitriani, A. 2023. Tracking of the antibiofilm activities of lakum extract (*Causonis trifolia* (L.) Mabb. and *J. Wen* Linn.) against *Staphylococcus aureus*, *Pakistan Journal of Biological Sciences*, **26**: 91-100.
- Choudhary, K., Singh, M., and Pillai, U. 2008, Ethnobotanical survey of Rajasthan-An update, *Am. Eurasian J. Bot.*, **1**: 38–45.
- Christensen, B.E. 1989, The role of extracellular polysaccharides in biofilms, *J Biotechnol.*, **10**: 181-202.
- Ciriciripohon.id. 2024. 'Ciri Ciri Pohon Bajakah (*Spatholobus littoralis* Hassk.)', Pohon Herbal, diakses tanggal 26 Juli 2024, <<https://ciriciripohon.id/ciri-ciri-pohon-bajakah/>>.
- Citron, D. M., Goldstein, E. J., Merriam, C. V., Lipsky, B. A., and Abramson, M. A. 2007, Bacteriology of moderate-to-severe diabetic foot infections and in vitro activity of antimicrobial agents. *Journal of clinical microbiology*, **45(9)**: 2819–2828.
- CLSI. 2024, Methods for Dilution Antimicrobial Susceptibility Tests for Bacteria That Grow Aerobically; Approved Standard—Twelveth Edition. *CLSI*, Januari 2012. p 12-19.

- Cokol, M., Chua, H.N., Tasan, M., Mutlu, B., Weinstein, Z.B., and Roth, F.P., 2011, Systematic exploration of synergistic drug pairs, *Molecular Systems Biology*, **7(1)**: 544. <https://doi.org/10.1038/msb.2011.71>
- Coskun, M.V., Uyanik, M.H. and Yazgi, H. 2019. Sensitivity of methicillin-resistant *Staphylococcus aureus* strains to fusidic acid and other non- β -lactam antibiotics. *Klimik J.* **32(1)**: 52–56. <https://doi.org/10.5152/kd.2019.12>
- Crutchfield, C.A., and Clarke, W. 2014. Present and future applications of high resolution mass spectrometry in the clinic. *Discoveries.* **2(2)**:e17.
- Da Silva, B.P., De Lima Miguel, R., Miletti, L.C. and De Quadros, R.M. 2025. Inhibitory effects of EDTA, farnesol, and xylitol on biofilms produced by *Staphylococcus aureus* and *Pseudomonas aeruginosa*. *The Microbe.* **7**: 100321. <https://doi.org/10.1016/j.microb.2025.100321>
- Davies, T.E., Li, H., Bessette, S., Gauvin, R., Patience, G.S., and Dummer, N.F. 2022, Experimental methods in chemical engineering: Scanning electron microscopy and X-ray ultra-microscopy—SEM and XuM, *Can J Chem Eng*, **100(11)**:3145–3159.
- Desrini, S., Girardot, M., Imbert, C., Mustofa, and Nuryastuti, T. 2023, Screening antibiofilm activity of invasive plants growing at the Slope Merapi Mountain, Central Java, against *Candida albicans*, *BMC Complementary Medicine and Therapies*, **23**: 232.
- Dewi, Y.S.K., Simamora, C.J.K., and Fadly, D. 2020, Antioxidant and Antimicrobial Activities of Methanolic Extracts of *Scorodocarpus borneensis* (Baill.) Becc. *Sys Rev Pharm*, **11(7)**: 246-252.
- Diggle, S.P. and Whiteley, M. 2020. Microbe Profile: *Pseudomonas aeruginosa*: opportunistic pathogen and lab rat. *Microbiology.* **166(1)**: 30–33. [doi:10.1099/mic.0.000860](https://doi.org/10.1099/mic.0.000860).
- Durand, B.A.R.N., Pouget, C., Magnan, C., Molle, V., Lavigne, J.P. and Dunyach-Remy, C. 2022. Bacterial interactions in the context of chronic wound biofilm: a review. *Microorganisms.* **10(8)**: 1500. [doi:10.3390/microorganisms10081500](https://doi.org/10.3390/microorganisms10081500).
- Echeverri, F. and Suarez, G.E. 1989, Flavonoids from *Passiflora foetida* L. and deterrant activity, *Revista Latinoamericana de Quimica*, **20**: 6-7.
- Echeverri, F., Cardona, G., Torres, F., Pelaez, C., Quiñones, W., and Renteria, E. 1991, Ermanin: an insect deterrent flavonoid from *Passiflora foetida* resin, *Phytochemistry*, **30(1)**: 153-5.
- Fischer, E.R., Hansen, B.T., Nair, V., Hoyt, F.H., Schwartz, C.L. and Dorward, D.W. 2024. Scanning electron microscopy. *Curr Protoc.* **4(11)**: e1034. <https://doi.org/10.1002/cpz1.1034>
- Flores-Sanchez, I.J. and Ramos-Valdivia, A.C. 2017, A review from patents inspired by two plant general: *Uncaria* and *Hamelia*, *Phytochemistry Reviews*, **16(4)**: 693–723.
- Gnanamani, A., Hariharan, P. and Paul-Satyaseela, M. 2017. *Staphylococcus aureus*: overview of bacteriology, clinical diseases, epidemiology, antibiotic resistance and therapeutic approach. In: Enany, S. and Crotty Alexander, L.E. (eds.) *Frontiers in Staphylococcus aureus*. InTech. [doi:10.5772/67338](https://doi.org/10.5772/67338).

- Golus, J., Sawicki, R., Widelski, J. and Ginalska, G. 2016. The agar microdilution method – a new method for antimicrobial susceptibility testing for essential oils and plant extracts. *J Appl Microbiol.* **121(5)**: 1291–1299. doi:10.1111/jam.13253
- Golus, J., Sawicki, R., Widelski, J., and Ginalska, G., 2016, The agar microdilution method – a new method for antimicrobial susceptibility testing for essential oils and plant extracts, *Journal of Applied Microbiology*, **121(5)**: 1291–1299.
- Greco, W.R., Bravo, G., and Parsons, J.C., 1995, The search for synergy: A critical review from a response surface perspective, *Pharmacological Reviews*, **47(2)**: 331–385.
- Gurning, K., Suratno, S., Astuti, E., and Haryadi, W. 2024. Untargeted LC/HRMS metabolomics analysis and anticancer activity assay on MCF-7 and A549 cells from *Coleus amboinicus* Lour leaf extract. *Iran J Pharm Res.* **23(1)**:e143494.
- Halim, B., Waturangi, D.E., and Yulandi, A. 2025, Control of biofilm from single and multispecies bacteria associated with food spoilage using metabolite of *Streptomyces* sp., *Sci Rep*, **15**:23956.
- Hamion, G., Aucher, W., Tardif, C., Miranda, J., Rouger, C., Imbert, C., and Girardot, M. 2022, Valorization of Invasive Plant Extracts against the Bispecies Biofilm *Staphylococcus aureus*–*Candida albicans* by a Bioguided Molecular Networking Screening, *Antibiotics*, **11**: 1595.
- Hamzah, H., Pratiwi, S.T., Jabbar, A., Jabbar, A., Mochtar, C.F., Rahmah, W., and Hafifah, A.S. 2022, Tracing Antibiofilm Activity and Biofilm Eradication of Bajakah Tampala (*Spatholobus littoralis* Hassk. Hassk) Ethanol Extract Against *Pseudomonas aeruginosa* Biofilm, *Eur. Chem. Bull.*, **11(8)**: 69 – 73.
- Hamzah, H., Pratiwi, S.T., Jabbar, A., Pratama, A., Putri, R.M. 2021, *Tumbuhan Bajakah Kalimantan (Spatholobus littoralis* Hassk. Hassk), CV Penulis Cerdas Indonesia, Malang. Indonesia.
- Han, H.-W., Kwak, J.-H., Jang, T.-S., Knowles, J.C., Kim, H.-W., Lee, H.-H. and Lee, J.-H. 2021. Grapefruit seed extract as a natural derived antibacterial substance against multidrug-resistant bacteria. *Antibiotics.* **10(1)**: 85. doi:10.3390/antibiotics10010085
- Hartanti, L., Ashari, A. M., and Warsidah, W. 2021, Total phenol and antioxidant activity of ethanol extract and water extract from claw *Uncaria gambir* Roxb, *Berkala Sainstek*, **9(3)**: 131-138.
- Hasanah, J., Kartika, R., dan Simanjuntak, P. 2020, ‘Uji Aktivitas Antioksidan dengan Metode Peredaman Radikal Bebas dan Sitotoksik dengan Metode Brine Shrimp Lethality Test (BSLT) Akar Bajakah (*Uncaria tomentosa* (Willd ex Schult). DC)’, Prosiding Seminar Nasional Kimia Berwawasan Lingkungan, Indonesia, pp 50–54. <https://doi.org/10.1093/femsle/fnab052>
- Huang, C., Li, X., Zhao, Q., Wang, Z., and Xu, H. 2025, Antimicrobial and anti-biofilm activity of *Polygonum chinense* aqueous extract against *Staphylococcus aureus*, *Front Microbiol*, **16**:145612.

- Huang, Z-H., Li, S-Q., Kou, Y., Huang, L., Yu, T., and Hu, A. 2019, Risk factors for the recurrence of diabetic foot ulcers among diabetic patients: a meta-analysis, *Int Wound J*, **16(6)**: 1373-1382.
- IMPLEN. 2024. 'OD 600 (Cell Density, Bacterial Growth, Yeast Growth)', IMPLEN, diakses tanggal 5 September 2024, <<https://www.implen.de/od600-diluphotometer/od600/>>.
- International Wound Infection Institute (IWII). 2022, *Wound Infection in Clinical Practice*, 3rd edition, Wounds International, London. UK.
- Ishida, H., Ishida, Y., Kurosaka, Y., Otani, T., Sato, K., and Kobayashi, H. 1998, *In vitro* and *in vivo* activities of levofloxacin against biofilm-producing *Pseudomonas aeruginosa*, *Antimicrob Agents Chemother*, **42**:1641-1645.
- Jabalameli, F., Mirsalehian, A., Sotoudeh, N., Jabalameli, L., Aligholi, M., Khoramian, B., Taherikalani, M. and Emaneini, M. 2011. Multiple-locus variable number of tandem repeats (VNTR) fingerprinting (MLVF) and antibacterial resistance profiles of extended spectrum beta lactamase (ESBL) producing *Pseudomonas aeruginosa* among burnt patients in Tehran. *Burns*. **37(7)**: 1202–1207. <https://doi.org/10.1016/j.burns.2011.05.012>
- Jamal, M., Ahmad, W., Andleeb, S., Jalil, F., Imran, M., Nawaz, M.A., Hussain, T., Ali, M., Rafiq, M., and Kamil, M A. 2018, Bacterial biofilm and associated infections, *J. Chin. Med. Assoc.*, **81**:7-11.
- Janeš, D., Kreft, S., Jurc, M., Seme, K. and Štrukelj, B. 2007. Antibacterial activity in higher fungi (mushrooms) and endophytic fungi from Slovenia. *Pharm Biol*. **45(9)**: 700–706. <https://doi.org/10.1080/13880200701575189>
- Jasuja, N.D. 2019, Evaluation of Primary Metabolites and Antioxidant Potential Activity of *Cayratia trifolia* (Leaf and Stems), *J. Drug Deliv. Ther.*, **9**: 367–372.
- Jeyaraj, E.J., Nathan, S., Lim, Y.Y., and Choo, W.S. 2022. Antibiofilm properties of *Clitoria ternatea* flower anthocyanin-rich fraction towards *Pseudomonas aeruginosa*. *Access Microbiol*. **4**:000343.
- Jung, B. and Hoilat, G.J. 2024. 'MacConkey Medium', *StatPearls* [Online]. Treasure Island (FL): StatPearls Publishing, Diakses tanggal 16 September 2025, <<https://www.ncbi.nlm.nih.gov/books/NBK557394/>>
- Karthik, S. and Padma, V. 2009. Phytochemical and microscopic analysis of tubers of *Ipomoea mauritiana* Jacq. (Convolvulaceae). *Pharmacognosy Magazine*. **5(19)**: 272–278.
- Khan, M., 2011. *Wound healing and the role of biomarkers and biofilms*. Governors State University.
- Khan, M., Chattagul, M., Tran, S., Freiberg, J.A., Nita-Lazar, A., and Shirlif, M.E. 2019, Temporal proteomic profiling reveals changes that support *Burkholderia* biofilms. *Pathog Dis*, **77**: ftz005.
- Khare, C.P. 2007, *Indian Medicinal Plants: An illustrated of Dictionary*, Springer, Berlin. Germany.
- Kim, D.J., Chung, S.G., Lee, S.H., and Choi, J.W. 2012, Relation of microbial biomass to counting units for *Pseudomonas aeruginosa*, *African Journal of Microbiology Research*, **6(21)**: 4620-4622.

- Kim, W., Conery, A.L., Rajamuthiah, R., Fuchs, B.B., Ausubel, F.M., and Mylonakis, E. 2015, Identification of an Antimicrobial Agent Effective against Methicillin Resistant *Staphylococcus aureus* Persisters Using a Fluorescence-Based Screening Strategy, *PLoS ONE*, **10(6)**: e0127640.
- Kipp, F., Becker, K., Peters, G. and von Eiff, C. 2004. Evaluation of different methods to detect methicillin resistance in small-colony variants of *Staphylococcus aureus*. *J Clin Microbiol.* **42(3)**: 1277–1279. doi:10.1128/JCM.42.3.1277-1279.2004.
- Klančnik, A., Piskernik, S., Jeršek, B. and Možina, S.S. 2010. Evaluation of diffusion and dilution methods to determine the antibacterial activity of plant extracts. *J Microbiol Methods.* **81(2)**: 121–126. <https://doi.org/10.1016/j.mimet.2010.02.004>
- Kodoh, J. 2005, Surveys of non-timber forest products traded in tamu, Sabah, Malaysia, *Sepilok Bull*, **3**: 27–36.
- Kot, B., Wierzchowska, K., Piechota, M. and Gruzewska, A. 2020. Antimicrobial resistance patterns in methicillin-resistant *Staphylococcus aureus* from patients hospitalized during 2015–2017 in hospitals in Poland. *Med Princ Pract.* **29(1)**: 61–68. <https://doi.org/10.1159/000501788>
- Krishnaveni A., Thaakur, and Rani, S. 2008, Pharma cognostical and preliminary phytochemical studies of *Passiflora foetida*, *Ancient science of life*, **27(3)**: 19–23.
- Kubota, K., Matsumoto, M., Ueda, M., and Kobayashi, A. 1994, New antimicrobial compound from *Scorodocarpus borneensis* (Baill.) Becc. Becc., *Biosci. Biotechnol. Biochem*, **58**: 430–431.
- Kustiawan, P.M., Siregar, K.A.A.K., Saleh, L.O., Batistuta, M.A., and Setiawan, I.M. 2021, A review of botanical characteristics, chemical composition, pharmacological activity and use of *Scorodocarpus borneensis* (Baill.) Becc., *Biointerface Res. Appl. Chem*, **12**: 8324–8334.
- Lavery, L.A., Hunt, N.A., Ndip, A., Lavery, D.C., Van Houtum, W., and Boulton, A.J.M. 2010, Impact of chronic kidney disease on survival after amputation in individuals with diabetes, *Diabetes Care*, **33(11)**: 2365–2369.
- Lawrence, J.R., Korber, D.R., Hoyle, B.D., Costerton, J.W., and Caldwell, D.E., 2003, Optical sectioning of microbial biofilms, *Journal of Bacteriology*, **185(24)**: 7054–7062. <https://doi.org/10.1128/JB.185.24.7054-7062.2003>
- Lee, K., Lee, K.-M., Go, J., Park, I.H., Shin, J.S., Choi, J.Y., and Yoon, S.S., 2020, AHL-mediated *quorum sensing* interaction between *Pseudomonas aeruginosa* and *Escherichia coli* enhances biofilm formation and antibiotic tolerance, *Frontiers in Microbiology*, **11**: 1730. <https://doi.org/10.3389/fmicb.2020.01730>
- Lemos, A.S.O., Florêncio, J.R., Pinto, N.C.C., Campos, L.M., Silva, T.P., Grazul, R.M., Pinto, P.F., Tavares, G.D., Scio, E., Apolônio, A.C.M., Melo, R.C.N. and Fabri, R.L. 2020. Antifungal activity of the natural coumarin scopoletin against planktonic cells and biofilms from a multidrug-resistant *Candida tropicalis* strain. *Front Microbiol.* **11**: 1525. <https://doi.org/10.3389/fmicb.2020.01525>

- Lipsky, B.A., Berendt, A R , Cornia, P.B., Pile, J.C., Peters, E.J., Armstrong, D.G., Deery, H.G., Embil, J.M., Joseph, W.S., Karchmer, A.W., Pinzur, M.S., and Senneville. E. 2012, Infectious Diseases Society of America. 2012 Infectious Diseases Society of America clinical practice guideline for the diagnosis and treatment of diabetic foot infections, *Clin Infect Dis*, **54**: e132-e173.
- Liu, H.Y., Prentice, E.L. and Webber, M.A. 2024. Mechanisms of antimicrobial resistance in biofilms. *npj Antimicrobials & Resistance*. **2**: 27. doi:10.1038/s44259-024-00046-3
- Liu, Y., Zhu, J., Liu, Z., Zhi, Y., Mei, C., and Wang, H., 2025, Flavonoids as promising natural compounds for combating bacterial infections, *International Journal of Molecular Sciences*, **26(6)**: 2455. <https://doi.org/10.3390/ijms26062455>
- Madigan, M.T., Martinko, J.M., and Brock, T.D. 2006, *Brock Biology of Microorganisms*, 11th edition, Pearson Prentice Hall, New Jersey.
- Mariani, F. and Galvan, E.M. 2023. *Staphylococcus aureus* in polymicrobial skin and soft tissue infections: impact of inter-species interactions in disease outcome. *Antibiotics*. **12(7)**: 1164. doi:10.3390/antibiotics12071164.
- Martínez-Rodríguez, O.P., García-Contreras, R., Aguayo-Ortiz, R. and Figueroa, M. 2023. Antimicrobial and antibiofilm activity of fungal metabolites on methicillin-resistant *Staphylococcus aureus* (ATCC 43300) mediated by SarA and AgrA. *Biofouling*. **39(7)**: 830–837. <https://doi.org/10.1080/08927014.2023.2276926>
- Mat Jalil, M.T., Zakaria, N.A., Yahya, M.F.Z.R., Mohamad, S.A.S. and Ibrahim, D. 2024. Assessment of biological activity, total phenolic content, and cytotoxicity of ethyl acetate extracts from an endophytic fungus, *Lasioidiplodia pseudotheobromae* IBRL OS-64. *HAYATI J Biosci*. **32(4)**: 445–458. <https://doi.org/10.4308/hjb.32.2.445-458>
- Meganathan, B. and Panagal, M. 2023, Wound Healing Potential of Bioactive Compound from *Cayratia trifolia* (L.): An In silico and In vitro analysis, *Biological Forum*, **15(5)**: 104-113.
- Michael and Waturangi, W.E. 2023, Antibiofilm activity from endophyte bacteria, *Vibrio cholerae* strains, and actinomycetes isolates in liquid and solid culture, *BMC Microbiology*, **23(83)**: 2-11.
- Miñán, A., Schilardi, P.L. and Fernández Lorenzo De Mele, M. 2016. The importance of 2D aggregates on the antimicrobial resistance of *Staphylococcus aureus* sessile bacteria. *Materials Sci Eng C*. **61**: 199–206. doi:10.1016/J.MSEC.2015.12.034
- Minardi, D., Montanari, M.P., Tili, E., Cochetti, I., Mingoia, M., Varaldo, P.E. and Muzzonigro, G. 2008. Effects of fluoroquinolones on bacterial adhesion and on preformed biofilm of strains isolated from urinary double J stents. *J Chemother*. **20(2)**: 195–201. doi:10.1179/joc.2008.20.2.195
- Minocha, R., Martinez, G., Lyons, B., and Long, S., 2009, Development of a standardized methodology for quantifying total chlorophyll and carotenoids from foliage of hardwood and conifer tree species, *Canadian Journal of Forest Research*, **39(4)**: 849–861. <https://doi.org/10.1139/X09-015>

- Mochtar, C.F., Saleh, L.O., Hamzah, H., and Ilyas, N.M. 2022, Potensi bajakah tampala (*Spatholobus littoralis* Hassk) sebagai antibakteri dan antijamur terhadap *Staphylococcus aureus* dan *Candida albicans*, *Jurnal Mandala Pharmacoon Indonesia*, **8(2)**: 177–184.
- Modi, K.P., Pagi, K.B., Lahiri, S.K. and Shah, M.B. 2019. Development of a validated HPTLC method for quantification of scopoletin in *Ipomoea turpethum* root and its market formulations. *Indian J Nat Prod.* **33(1)**: 49–52.
- Moya-Salazar, J., Chamana J.M., Porrás-Rivera, D., Goicochea-Palomino, E.A., Salazar, C.R. and Contreras-Pulache, H. 2023, Increase in antibiotic resistance in diabetic foot infections among peruvian patients: a single-center cross-sectional study, *Front. Endocrinol*, **14**:1267699.
- Muskhazli, M., Nurhafiza, Y., Nor Azwady, A.A. and Nor Dalilah, E. 2008. Comparative Study on the in vitro Antibacterial Efficacy of Aqueous and Methanolic Extracts of *Quercus infectoria* Gall's Against *Cellulosimicrobium cellulans*. *Journal of Biological Sciences.* **8**: 634–638. doi:10.3923/jbs.2008.634.638
- Najari, H. R., Karimian, T., Parsa, H., QasemiBarqi, R. and Allami, A. 2019, Bacteriology of moderate-to-severe diabetic foot infections in two tertiary hospitals of Iran. *Foot*, **40**: 54–58.
- Nastati dan Nugraha, 2022, Aktivitas antiinflamasi ekstrak kayu bajakah (*Spatholobus littoralis* Hassk. Hask), *Jurnal Surya Medika*, **7(2)**: 45–50.
- Nguyen, T.Y., To, D.C., Tran, M.H., Lee, J.S., Lee, J.H., Kim, J.A., Woo, M.H. and Min, B.S. 2015, Anti-inflammatory flavonoids isolated from *Passiflora foetida* L., *Natural Product Communication*, **10(6)**: 1934578X1501000634
- Nostro, A., Roccaro, A.S., Bisignano, G., Marino, A., Cannateli, M.A., Pizzimenti, F.C., Cioni, P.L., Procopio, F., and Blanco, A.R., 2007, Effects of Oregano, Carvacrol and Thymol on *Staphylococcus aureus* And *Staphylococcus epidermidis* Biofilms, *J Med Microbiol.*, **56**: 519–523.
- NParks, 2024. '*Causonis trifolia* (L.) Mabb. and J. Wen', National Parks Flora & Fauna Web, diakses tanggal 26 Juli 2024, <<https://www.nparks.gov.sg/florafaunaweb>>.
- NParks, 2024. '*Passiflora foetida* L.', National Parks Flora & Fauna Web, diakses tanggal 26 Juli 2024, <<https://www.nparks.gov.sg/florafaunaweb>>.
- O'Neill, J. 2016, *Tackling drug-resistant infections globally: Final report and recommendations*, Government of The United Kingdom, London. UK.
- Oberdorfer, K., Swoboda, S., Hamann, A., Baertsch, U., Kusterer, B., Born, T., Hoppe-Tichy, H.K., Geiss, H., von Baum H. 2004. Tissue and serum levofloxacin concentrations in diabetic foot infection patients. *J Antimicrob Chemother.* **54(4)**: 836–839. doi:10.1093/jac/dkh412
- Onyango, L.A., Dunstan, R.H., Gottfries, J., von Eiff, C. and Roberts, T.K. 2012. Effect of low temperature on growth and ultrastructure of *Staphylococcus* spp. *PLoS One.* **7(1)**: e29031. doi:10.1371/journal.pone.0029031.
- Peeters, E., Nelis, H.J., and Coenye, T., 2008, Comparison of multiple methods for quantification of microbial biofilms grown in microtiter plates, *Journal of Microbiological Methods*, **72(2)**: 157–165. <https://doi.org/10.1016/j.mimet.2007.11.010>

- Percival, S.L. and Williams, D.W. 2014. *Escherichia coli*. In: Percival, S.L. (ed.) *Microbiology of Waterborne Diseases*. Elsevier, pp. 89–117. doi:10.1016/B978-0-12-415846-7.00006-8.
- Piciooreanu, C., van Loosdrecht, M.C.M., and Heijnen, J.J., 2018, Microbial biofilm structures: from imaging to modelling, *Nature Reviews Microbiology*, **16(3)**: 143–155. <https://doi.org/10.1038/nrmicro.2017.119>
- Pierce, C.G., Uppuluri, P., Tummala, S., and Lopez-Ribot, J.L. 2010, A 96 well microtiter plate-based method for monitoring formation and antifungal susceptibility testing of *Candida albicans* biofilms, *J Vis Exp*, **44**:2287.
- Polonio, J.C., Reis, R.S., Barros, T.C., Silva, G.H., and Cavalcanti, M.A.Q. 2015. Biotechnological prospecting of foliar endophytic fungi of guaco (*Mikania glomerata* Spreng.) with antibacterial and antagonistic activity against phytopathogens. *Genetics and Molecular Research*. **14(3)**:7297–7309. <https://doi.org/10.4238/2015.July.3.5>
- Pouget, C., Dunyach-Remy, C., Pantel, A., Boutet-Dubois, A., Schuldiner, S., Sotto, A., Lavigne, J.-P., and Loubet, P., 2021, Alternative approaches for the management of diabetic foot ulcers, *Front. Microbiol*, **12**: 747618.
- POWO, 2024. '*Causonis trifolia* (L.) Mabb. and J. Wen', Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew, diakses tanggal 25 Juli 2024, <<https://powo.science.kew.org>>.
- POWO, 2024. '*Passiflora foetida* L.', Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew, diakses tanggal 25 Juli 2024, <<https://powo.science.kew.org>>.
- POWO, 2024. '*Scorodocarpus borneensis* (Baill.) Becc.', Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew, diakses tanggal 25 Juli 2024, <<https://powo.science.kew.org>>.
- POWO, 2024. '*Spatholobus littoralis* Hassk.', Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew, diakses tanggal 25 Juli 2024, <<https://powo.science.kew.org>>.
- Prabowo, W.C. and Agustina, R. 2020. Antibacterial activity of scopoletin from stem bark of *Aleurites moluccana* against *Salmonella typhi*. *J Trop Pharm Chem*. **5(1)**: 29–32. <https://doi.org/10.25026/jtpc.v5i1.218>
- Prasetyo B., Linda R., dan Mukarlina. 2016, Pemanfaatan Tumbuhan Lakum (*Cayratia trifolia* (L.) Domin.) oleh Etnis Melayu di Kecamatan Sungai Kunyit Kabupaten Mempawah, *Protobiont*, **5(2)**: 25-33.
- Pratiwi, S.U.T., Lagendijk, E.L., Hertiani, T., de Weert, S., and Hondel, C.V.D. 2015, Anti-microbial effects of Indonesian Medicinal Plants Extracts on Planktonic and Biofilm Growth of *Pseudomonas aeruginosa* and *Staphylococcus aureus*. *International Journal of Pharmacy and Pharmaceutical Sciences*. **7 (4)**: 183-191.
- Price-Whelan, A., Dietrich, L.E.P., and Newman, D.K., 2007, Pyocyanin alters redox homeostasis and carbon flux through central metabolic pathways in *Pseudomonas aeruginosa*, *Journal of Bacteriology*, **189(17)**: 6372–6381. <https://doi.org/10.1128/JB.00505-07>

- Proctor, R.A. and Peters, G. 1998. Small-colony variants in staphylococcal infections: diagnostic and therapeutic implications. *Clin Infect Dis.* **27(2)**: 419–422. doi:10.1086/514706.
- Putri, H.F.W., Khusmitha, Q. N., Mahardhika, G.P.C., Hidayati, D.Y.N., Raras, T.Y.M., and Norahmawati, E. 2022, Comparison of phytochemical content and antifungal activity of bajakah tampala stem (*Spatholobus littoralis* Hassk. Hassk.) methanol and ethanol extracts against *Candida albicans*, *Asian Journal of Health Research*, **1(2)**: 19–24.
- Qin, H., Cao, H., Zhao, Y., Zhu, C., Cheng, T., Wang, Q., Peng, X., Cheng, M., Wang, J., Jin, G., Jiang, Y., Zhang, X., Liu, X., and Chu, P. K. 2014, In vitro and in vivo anti-biofilm effects of silver nanoparticles immobilized on titanium, *Biomaterials*, **35(33)**: 9114–9125.
- Quave, C.L., Plano, L.R.W., Pantuso, T., and Benett, B.C., 2008, Effects of Extracts From Italian Medicinal Plants On Planktonic Growth, Biofilm Formation and Adherence of Methicillin-Resistant *Staphylococcus aureus*, *J Ethnopharmacol.*, **118**: 418 – 428.
- Radhamani, T.R., Sudarshana, L., and Krishnan, R. 1995, Defense and carnivory: dual role of bracts in *Passiflora foetida* L., *J Biosci*, **20(5)**: 657–64.
- Rafi, M., Hayati, F., Umar, A.H., Septianingsih, D.A. and Rachmatiah, T. 2023, LC-HRMS-based metabolomics to evaluate the phytochemical profile and antioxidant capacity of *Cosmos caudatus* with different extraction methods and solvents. *Arab J Chem.* **16(6)**:105065.
- Raja, J.M., Maturana, M.A., Kayali, S., Khouzam, A., and Efevbokhan, N. 2023, Diabetic foot ulcer: A comprehensive review of pathophysiology and management modalities, *World J Clin Cases*, **11(8)**: 1684-1693.
- Ranjith, K., Nagapriya, B., and Shivaji, S. 2022, Polymicrobial biofilms of ocular bacteria and fungi on ex vivo human corneas, *Scientific Reports*. **12**: 11606. <https://doi.org/10.1038/s41598-022-15809-z>
- Ravipati, A.S., Reddy, N., and Koyyalamudi, S.R. 2014, Biologically active compounds from the genus *Uncaria* (*Rubiaceae*), *Studies in Natural Products Chemistry*, **43**: 381–408.
- Relucenti, M., Familiari, G., Donfrancesco, O., Taurino, M., Li, X., Chen, R., Artini, M., Papa, R., and Selan, L. 2021, Microscopy methods for biofilm imaging: focus on SEM and VP-SEM pros and cons, *Biology*, **10(1)**:51.
- Romeo, T. 2008. *Bacterial Biofilms*, Springer, Berlin. Germany.
- Rutz, A., and Wolfender, J.L. 2023. Automated composition assessment of natural extracts: untargeted mass spectrometry-based metabolite profiling integrating semiquantitative detection. *J Agric Food Chem.* **71(46)**:18010–18023.
- Sadeghpour, H.F., Zakrzewski, M., Vickery, K., Armstrong, D., and Hu H. 2019, Bacterial Diversity of Diabetic Foot Ulcers: Current Status and Future Prospectives, *J Clin Med*, **8(11)**: 1935.
- Salah, M., Badr, G., Hetta, H.F., Khalifa, W.A., and Shoreit, A.A., 2022, Fig latex inhibits the growth of pathogenic bacteria invading human diabetic wounds and accelerates wound closure in diabetic mice, *Sci. Rep*, **12**: 21852.
- Salinas, C., Florentín, G., Rodríguez, F., Alvarenga, N., and Guillén, R. 2022, Terpenes combinations inhibit biofilm formation in *Staphylococcus aureus* by

- interfering with initial adhesion, *Microorganisms*. **10(8)**: 1527. <https://doi.org/10.3390/microorganisms10081527>
- Sapkota, A. 2022. 'Blood Agar-Composition, Principle, Preparation, Uses and Hemolysis', *Microbe Notes*. diakses tanggal 12 Oktober 2024, <<https://microbenotes.com/blood-agar-composition-principle-preparation-and-uses/>>
- Sari, R.S.E., Soegianto L., and Hermanu, L.S. 2018, Uji Aktivitas Antimikroba Ekstrak Etanol Daun *Cayratia trifolia* terhadap *Staphylococcus aureus* dan *Candida albicans*, *J. Pharm. Sci. Pract.*, **5**: 23-29.
- Sasikala, V., Saravanan, S., and Parimelazhagan, T. 2011, Analgesic and anti-inflammatory activities of *Passiflora foetida* L. L, *Asian Pacific journal of tropical medicine*, **4(8)**: 6003.
- Sathish, R., Sahu, A., and Natarajan, K. 2011, Antiulcer and antioxidant activity of ethanolic extract of *Passiflora foetida* L. L, *Indian Journal of Pharmacology*, **43(3)**: 336.
- Seifert, H., Oltmanns, D., Becker, K., Wisplinghoff, H. and von Eiff, C. 2005. *Staphylococcus lugdunensis* pacemaker-related infection. *Emerg Infect Dis*. **11(8)**: 1283–1286. doi:10.3201/eid1108.041177.
- Setyowati, E., Irzani, E.F., Luthfi, C.F.M., and Hamzah, H. 2024, Tracing The Antibacterial, Antifungal and Anti Biofilm Activities of Root Extract Bajakah Tampala (*Spatholobus littoralis* Hassk. Hassk), *Jurnal Farmasi Sains dan Praktis*, **10(1)**: 32-41.
- She, P., Luo, Z., Chen, L., and Wu, Y. 2018. Efficacy of levofloxacin against biofilms of *Pseudomonas aeruginosa* isolated from patients with respiratory tract infections in vitro, *Microbiology Open*. **8**: 1-9.
- Sifri, C.D., Baresch-Bernal, A., Calderwood, S.B. and von Eiff, C. 2006. Virulence of *Staphylococcus aureus* small-colony variants in the *Caenorhabditis elegans* infection model. *Infect Immun*. **74(2)**: 1091–1096. doi:10.1128/IAI.74.2.1091-1096.2006.
- Silva, E., Teixeira, J.A., Pereira, M.O., Rocha, C.M.R., and Sousa, A.M., 2023, Evolving Biofilm Inhibition and Eradication in Clinical Settings through Plant-Based Antibiofilm Agents, *Phytomedicine*, **119**: 154973. <https://doi.org/10.1016/j.phymed.2023.154973>
- Simao, M.J., Barboza, T.J.S., Vianna, M.G., Garcia, R., Mansur, E., Ignacio, A.C.P.R., and Pacheco, G. 2018, A comparative study of phytoconstituents and antibacterial activity of *in vitro* derived materials of four *Passiflora* species, *Annals of the Brazilian Academy of Sciences*, **90(3)**: 2805-2813.
- Socfindo Conservation, 2024. 'Fox Grape', Plant Index, diakses tanggal 26 Juli 2024, <<https://www.socfindoconservation.co.id/index>>.
- Song, Y., Zhu, M., Hao, H., Deng, J., Li, M., Sun, Y., Yang, R., Wang, H., and Huang, R. 2019, Structure characterization of a novel polysaccharide from Chinese wild fruits (*Passiflora foetida* L.) and its immune-enhancing activity, *International Journal of Biological Macromolecules*, **136**: 324-31
- Stacy, A., Diggie, S.P., and Whiteley, M., 2016, Rules of engagement: defining bacterial communication in multispecies communities, *Cell Host & Microbe*, **18(3)**: 275–282. <https://doi.org/10.1016/j.chom.2015.07.013>

- Stanley, N.R. and Lazazzera, B.A. 2004. Environmental signals and regulatory pathways that influence biofilm formation. *Mol Microbiol.* **52(4)**: 917 - 924.
- Sulaiman, C.T., Shahida, V., and Balachandran, I., 2015, Effect of extraction solvent on the phytoconstituents of *Aegle marmelos* (L.) Correa, *Journal of Natural Remedies*, **15(1)**: 58–64. <https://doi.org/10.18311/jnr/2015/498>
- Sutherland, I.W. 1990^a, *Biotechnology of Exopolysaccharides*. Cambridge University Press. Cambridge.
- Sutherland, I.W. 2001^b, Biofilm exopolysaccharides: A strong and sticky framework, *Microb*, **147**: 3-9.
- Swarnkar, S., and Katewa, S.S. 2008, Ethnobotanical observation on tuberous plants from tribal area of Rajasthan (India). *Ethnobot. Leaflet*, **12**: 647-660.
- Tan, W.N., and Lim, S.H.E., 2015, Antibacterial and antioxidant properties of plant-derived compounds: methodological considerations for microdilution assays, *Journal of Applied Microbiology*, **118(6)**: 1431–1443.
- Thakur, S., Ray, S., Jhunjhunwala, S., and Nandi, D. 2020, Insights into coumarin-mediated inhibition of biofilm formation in *Salmonella Typhimurium*, *Biofouling*. **36(4)**: 479–491. <https://doi.org/10.1080/08927014.2020.1773447>
- von Eiff, C., Peters, G. and Becker, K. 2006. The small-colony variant (SCV) concept: the role of staphylococcal SCVs in persistent infections. *Injury*. **37(Suppl 2)**: S26–S33. doi:10.1016/j.injury.2006.04.006.
- Wada, F.W., Mekonnen, M.F., Sawiso, E.D., Kolato, S., Woldegiorgis, L., Kera, G.K., El- Khatib, Z., Ashuro, A.A., Biru, M., and Boltana, M.T., 2023, Bacterial profile and antimicrobial resistance patterns of infected diabetic foot ulcers in sub-Saharan Africa: a systematic review and meta-analysis, *Sci. Rep.*, **13**: 14655.
- Wei, Y., Lei, L., Jiang, H., Du, Q., Liu, D., Chen, L., Shi, X., Wang, Y., Li, J., Hu, Y., Xia, X., and Tu, J. 2025. Antibacterial and antibiofilm activities and mechanisms of *Toona sinensis* extracts against *Bacillus cereus* and its application in milk. *Curr Res Food Sci.* **10**:101045.
- Wuart, C., Shorna, A.A., Rahmatullah, M., Nissapatorn, V., Seelan, J.S.S., Rahman, H., Rusdi, N.A., Mustaffa, N., Elbehairy, L., and Sulaiman, M. 2023, The garlic tree of borneo, *Scorodocarpus borneensis* (Baill.) Becc. (Olacaceae): Potential Utilization in Pharmaceutical, Nutraceutical, and Functional Cosmetic Industries, *Molecules*, **28**: 5717.
- Wolcott, R., Costerton, J.W., Raoult, D. and Cutler, S.J. 2013. The polymicrobial nature of biofilm infection. *Clin Microbiol Infect.* **19(2)**: 107–112.
- Yewale, S., Farash, Z., Kulkarni, S., and Palghadmal, S., 2022, Effect of solvent polarity on extraction yield of total flavonoids with special emphasis to glabridin from *Glycyrrhiza glabra* roots, *Fabad Eczacılık Bilimler Dergisi*, **47(1)**: 1–12. <https://doi.org/10.55262/fabadezczacilik.1078751>
- Yuan, Y., Li, J., Lin, J., and Zhang, W., 2021, Extracellular products-mediated interspecific interaction between *Pseudomonas aeruginosa* and *Escherichia coli*, *Journal of Microbiology*, **59(1)**: 29–40. <https://doi.org/10.1007/s12275-021-0478-0>

- Zou, Y., Wang, J., Liao, H., Peng, D., Zhang, X., Luke, R., Tembrock, and Wu, Z. 2023, Multi-integrated genomic data for *Passiflora foetida* L. provides insights into genome size evolution and floral development in Passiflora, *Molecular Horticulture*. **3**: 27.
- Zubair, M. 2024, Antimicrobial and Anti-Biofilm Activities of *Coffea arabica* L. Against the Clinical Strains Isolated from Diabetic Foot Ulcers, *Cureus*, **16(1)**: e52539.