

DAFTAR PUSTAKA

1. Huemer M, Mairpady Shambat S, Brugger SD, Zinkernagel AS. Antibiotic Resistance and Persistence-Implications for Human Health and Treatment Perspectives. *EMBO Rep.* 2020;21(12):1–24.
2. Church NA, Mckillip JL. Antibiotic Resistance Crisis: Challenges and Imperatives. *Biologia (Bratisl).* 2021;76:1535–50.
3. WHO. New Report Calls for Urgent Action to Avert Antimicrobial Resistance Crisis [Internet]. 2019 [cited 2023 Nov 22]. Available from: <https://www.who.int/news/item/29-04-2019-new-report-calls-for-urgent-action-to-avert-antimicrobial-resistance-crisis>
4. Murray CJ, Ikuta KS, Sharara F, Swetschinski L, Robles Aguilar G, Gray A, et al. Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis. *The Lancet.* 2022;399(10325):629–55.
5. Silver LL. Challenges of Antibacterial Discovery. *Clin Microbiol Rev.* 2011;24(1):71–109.
6. Liu X, Shen J, Zhu K. Antibacterial Activities of Plant-Derived Xanthenes. *RSC Med Chem.* 2022;13(2):107–16.
7. Álvarez-Martínez FJ, Barrajón-Catalán E, Micol V. Tackling Antibiotic Resistance with Compounds of Natural Origin: A Comprehensive Review. *Biomedicines.* 2020;8(405):1–30.
8. Silver LL. Natural Products as a Source of Drug Leads to Overcome Drug Resistance. *Future Microbiol.* 2015;10(11):1711–8.
9. Ansori ANM, Fadholly A, Hayaza S, Susilo RJK, Inayatillah B, Winarni D, et al. A Review on Medicinal Properties of Mangosteen (*Garcinia mangostana* L.). *Res J Pharm Technol.* 2020;13(2):974–82.
10. Remali J, Sahidin I, Aizat WM. Xanthone Biosynthetic Pathway in Plants: A Review. Vol. 13, *Frontiers in Plant Science*. Frontiers Media S.A.; 2022.
11. Ragasa CY, Joyce C, Crisostomo J, Divina K, Garcia C, Shen CC. Antimicrobial Xanthenes from *Garcinia mangostana* L. *The Philippine Scientist.* 2010;47:63–75.
12. Phuong NTM, Van Quang N, Mai TT, Anh NV, Kuhakarn C, Reutrakul V, et al. Antibiofilm Activity of α -mangostin Extracted from *Garcinia mangostana* L. Against *Staphylococcus aureus*. *Asian Pac J Trop Med.* 2017;10(12):1154–60.
13. Valasani KR, Carlson EA, Battaile KP, Bisson A, Wang C, Lovell S, et al. High-resolution crystal structures of two crystal forms of human cyclophilin D in complex with PEG 400 molecules. *Acta Crystallographica Section F: Structural Biology Communications.* 2014;70(6):717–22.
14. Gurung AB, Ali MA, Lee J, Farah MA, Al-Anazi KM. An Updated Review of Computer-Aided Drug Design and Its Application to COVID-19. *Biomed Res Int.* 2021;2021:1–18.

15. Pantaleão SQ, Fernandes PO, Gonçalves JE, Maltarollo VG, Honorio KM. Recent Advances in the Prediction of Pharmacokinetics Properties in Drug Design Studies: A Review. *ChemMedChem*. 2022 Jan 5;17(1):1–13.
16. Doytchinova I. Drug Design—Past, Present, Future. *Molecules*. 2022;27(5):1–9.
17. Suhud F. Uji Aktivitas In-silico Senyawa Baru 1-Benzil-3-benzoilurea Induk dan Tersubstitusi sebagai Agen Antiproliferatif. *Jurnal Farmasi Indonesia* . 2015;7(4):242–51.
18. Earlia N, Prakoeswa CRS, Idroes R, Khairan. Kajian In Silico dan Aplikasi Klinis Minyak Kelapa Tradisional Aceh Sebagai Terapi Adjuvant pada Dermatitis Atopik. Banda Aceh: Syiah Kuala University Press; 2023. 1–106 p.
19. Bhatt TK, Nimesh S, editors. *The Design & Development of Novel Drugs and Vaccines : Principles and Protocols*. India: Elsevier; 2021.
20. Tsagkaris C, Corriero AC, Rayan RA, Moysidis D V., Papazoglou AS, Alexiou A. Success stories in computer-aided drug design. In: *Computational Approaches in Drug Discovery, Development and Systems Pharmacology*. Elsevier; 2023. p. 237–53.
21. Muchtaridi, Yanuar A, Megantara S, Purnomo H. *Kimia Medisinal : Dasar-Dasar dalam Perancangan Obat*. 1st ed. Jakarta: PRENAMEDIA GORUP; 2018. 1–306 p.
22. Yadav V, Reang J, Vinita, Tonk RK. Ligand-based drug design (LBDD). *Computer Aided Drug Design (CADD): From Ligand-Based Methods to Structure-Based Approaches*. 2022;57–99.
23. Sharma V, Wakode S, Kumar H. Structure and Ligand-Based Drug Design: Concepts, Approaches, and Challenges. In: *Chemoinformatics and Bioinformatics in the Pharmaceutical Sciences*. Elsevier; 2021. p. 27–53.
24. Elizabeth K, Amalia E. Approaches for Drug Design and Discovery. *Indonesian Journal of Pharmaceutics*. 2022;4(2):242–54.
25. Pratama AA, Rifai Y, Marzuki A. Docking Molekuler Senyawa 5-5'-Dibromometilsesamin. *Majalah Farmasi dan Farmakologi*. 2017;21(3):67–9.
26. Setiawan H, Irawan MI. Kajian Pendekatan Penempatan Ligan pada Protein Menggunakan Algoritma Genetika. *Jurnal Sains dan Seni ITS*. 2017;6(2):2337–3520.
27. Guedes IA, de Magalhães CS, Dardenne LE. Receptor-Ligand Molecular Docking. *Biophys Rev*. 2014;6:75–87.
28. Meng XY, Zhang HX, Mezei M, Cui M. Molecular Docking: A Powerful Approach for Structure-Based Drug Discovery. *Curr Comput Aided Drug Des*. 2011;7(2):146–57.
29. Ambarsari L, Sumaryada TI. Simulasi Docking Senyawa Kurkumin dan Analognya Sebagai Inhibitor Reseptor Androgen pada Kanker Prostat. *Current Biochemistry*. 2014;1(1):11–9.

30. Raval K, Ganatra T. Basics, Types and Applications of Molecular Docking: A Review. *IP International Journal of Comprehensive and Advanced Pharmacology*. 2022;7(1):12–6.
31. Putra PP. Teori dan Tutorial Molecular Docking Menggunakan AutoDock Vina. 1st ed. Wahid N, editor. Banyumas: Wawasan Ilmu; 2022.
32. Dias R, de Azevedo Jr. W. Molecular Docking Algorithms. *Curr Drug Targets*. 2008;9(12):1040–7.
33. Sahoo JP, Mohapatra U. Molecular Docking. *Agriculture & Food*. 2020;2(10):135–7.
34. Drug Discovery | Schrödinger [Internet]. [cited 2023 Nov 21]. Available from: <https://www.schrodinger.com/platform/drug-discovery>
35. Khaerunnisa S, Suhartati, Awaluddin R. Penelitian In Silico Untuk Pemula. Surabaya: Airlangga University Press; 2020. 1–101 p.
36. Ferrier DR. *Biochemistry*. 7th ed. Philadelphia: Lippincott Williams & Wilkins; 2017.
37. Siswandono. *Kimia Medisinal 1*. Surabaya: Airlangga University Press; 2016. 1–590 p.
38. Levita J, Mustarichie R. *Pemodelan Molekul Dalam Kimia Medisinal*. Yogyakarta: Graha Ilmu; 2012. 1–90 p.
39. Muflihunna A, Sukmawati S. In Silico Study of Java Wood (*Lannea coromadelica*) as Anti Inflammatory in TNF- α and COX-2 Mediators. *Indonesian Journal of Pharmaceutical Science and Technology*. 2023;1(1):42–50.
40. Kilo A La, Aman LO, Sabihi I, Kilo J La. Study of Potential of 1-N-Substituted Pyrazoline Analogues of Thiosemicarbazones as Antiamoebic Agent using In Silico Screening. *Indo J Chem Res*. 2019;7(1):9–16.
41. Agus ASR, Purnaningtyas SRD, Wahidin, Sari DRT, Ischak NI, Gianti L, et al. *Kimia Medisinal*. Padang: PT Global Eksekutif Teknologi; 2023. 1–166 p.
42. Subramanian R. Drug absorption and metabolism: understanding the journey of medications inside the body. *Drug Development & Research*. 2023;3(15):1–3.
43. Zhong HA. ADMET properties: Overview and current topics. In: *Drug Design: Principles and Applications*. Springer Singapore; 2017. p. 113–33.
44. Barreto EF, Larson TR, Koubek EJ. *Drug Excretion*. Reference Module in Biomedical Sciences. 2021;
45. Smith DA. *Metabolism, Pharmacokinetics, and Toxicity of Functional Groups*. Smith DA, editor. Cambridge: The Royal Society of Chemistry; 2010. 1–512 p.
46. Mardiana L. *Ramuan dan Khasiat Kulit Manggis*. Jakarta: Penebar Swadaya Grup; 2011. 1–82 p.

47. Nasution NH, Nasution IW. *Induksi Kalus Manggis (Garcinia mangostana L.)*. Pekalongan: PT. Nasya Expanding Management; 2022.
48. Pedraza-Chaverri J, Cárdenas-Rodríguez N, Orozco-Ibarra M, Pérez-Rojas JM. Medicinal Properties of Mangosteen (*Garcinia mangostana*). *Food and Chemical Toxicology*. 2008;46:3227–39.
49. Espirito Santo BLS do, Santana LF, Kato Junior WH, de Araújo F de O, Bogo D, Freitas K de C, et al. Medicinal Potential of *Garcinia* Species and Their Compounds. *Molecules*. 2020;25(4513):1–30.
50. Bi C, Xu H, Yu J, Ding Z, Liu Z. Botanical Characteristics, Chemical Components, Biological Activity, and Potential Applications of Mangosteen. *PeerJ*. 2023;11(15329):1–29.
51. Niaz K, Khan F. Analysis of Polyphenolics. In: *Recent Advances in Natural Products Analysis*. Elsevier; 2020. p. 39–197.
52. Gul S, Aslam K, Pirzada Q, Rauf A, Khalil AA, Semwal P, et al. Xanthones: A Class of Heterocyclic Compounds with Anticancer Potential. *Curr Top Med Chem*. 2022;22(23):1930–49.
53. Putri IP. Effectivity of Xanthone of Mangosteen (*Garcinia mangostana L.*) Rind as Anticancer. *Jurnal Majority*. 2015;4(1):33–8.
54. Schmid W. Ueber das mangostin. *Liebigs*. 1855;93:83–9.
55. Yates P, Stout GH. The Structure of Mangostin. *J Am Chem Soc*. 1958;80(7):1691–700.
56. Stout GH, Krahn MM, Yates P, Bhat HB. The Structure of Mangostin. *Chemical Communications (London)*. 1968;211–2.
57. Dragendorff O. Ubes das Harz von *Garcinia Mangostana L.* *Liebigs Ann Chem*. 1930;482:280–301.
58. Yates P, Bhat HB. Structure of β -mangostin. *Can J Chem*. 1968;46(23):3770–2.
59. Mahabusarakam W, Wiriyachitra P, Taylor WC. Chemical Constituents of *Garcinia mangostana*. *J Nat Prod*. 1987;50(3):474–8.
60. Jinsart W, Ternai B, Buddhasukh D, Polya GM. Inhibition of wheat embryo calcium-dependent protein kinase and other kinases by mangostin and γ -mangostin. *Phytochemistry*. 1992;31(11):3711–3.
61. Jefferson AQA, Scheimann F, Sim KY. Isolation of γ -mangostin from *Garcinia Mangostana* and preparation of the natural mangostins by Selective Demethylation. *Aust J Chem*. 1970;23:2539–43.
62. Nilar, Harrison LJ. Xanthones from The Heartwood of *Garcinia mangostana*. *Phytochemistry*. 2002;60(5):541–8.
63. Vieira LMM, Kijjoa A. Naturally-Occurring Xanthones: Recent Developments. *Curr Med Chem*. 2005;12(21):2413–46.

64. Chin YW, Jung HA, Chai H, Keller WJ, Kinghorn AD. Xanthonones with Quinone Reductase-Inducing activity from the fruits of *Garcinia mangostana* (Mangosteen). *Phytochemistry*. 2008;69(3):754–8.
65. Holloway DM, Scheinmann F. Phenolic Compounds from the Heartwood of *Garcinia mangostana*. *Phytochemistry*. 1975;14(11):2517–8.
66. Yu L, Zhao M, Yang B, Zhao Q, Jiang Y. Phenolics from Hull of *Garcinia mangostana* Fruit and Their Antioxidant Activities. *Food Chem*. 2007;104(1):176–81.
67. Chin YW, Jung HA, Chai H, Keller WJ, Kinghorn AD. Xanthonones with Quinone Reductase-Inducing activity from the fruits of *Garcinia mangostana* (Mangosteen). *Phytochemistry*. 2008;69(3):754–8.
68. Asai F, Tosa H, Tanaka T, Linuma M. A Xanthone from Pericarps of *Garcinia mangostana*. *Phytochemistry*. 1995;39:943–4.
69. Farnsworth R, Bunyaphatsara N. *Garcinia mangostana* Linn. In Thai. Bangkok: Prachachon Co., Ltd; 1992. 160–162 p.
70. Peres V, Nagem TJ, de Oliveira FF. Tetraoxygenated Naturally Occurring Xanthonones. *Phytochemistry*. 2000;55(7):683–710.
71. Ee GCL, Daud S, Taufiq-Yap YH, Ismail NH, Rahmani M. Xanthonones from *Garcinia mangostana* (Guttiferae). *Nat Prod Res*. 2006;20(12):1067–73.
72. Matsumoto K, Akao Y, Ohguchi K, Ito T, Tanaka T, Iinuma M, et al. Xanthonones Induce Cell-Cycle Arrest and Apoptosis in Human Colon Cancer DLD-1 Cells. *Bioorg Med Chem*. 2005;13(21):6064–9.
73. Suksamrarn S, Suwannapoch N, Phakhodee W, Thanuhiranlert J, Ratananukul P, Chimnoi N, et al. Antimycobacterial Activity of Prenylated Xanthonones from the Fruits of *Garcinia mangostana*. *Chem Pharm Bull (Tokyo)*. 2003;51(7):857–9.
74. Suksamrarn S, Komutiban O, Ratananukul P, Chimnoi N, Lartpornmatulee N, Suksamrarn A. Cytotoxic Prenylated Xanthonones from the Young Fruit of *Garcinia mangostana*. *Chem Pharm Bull (Tokyo)*. 2006;54(3):301–5.
75. Jung HA, Su BN, Keller WJ, Mehta RG, Kinghorn AD. Antioxidant Xanthonones from the Pericarp of *Garcinia mangostana* (Mangosteen). *J Agric Food Chem*. 2006;54(6):2077–82.
76. Chairungrilerd N, Takeuchi K, Ohizumi Y, Nozoe S, Ohta T. Mangostanol, a prenyl xanthone from *Garcinia mangostana*. *Phytochemistry*. 1996;43(5):1099–102.
77. Huang YL, Chen CC, Chen YJ, Huang RL, Shieh BJ. Three Xanthonones and a Benzophenone from *Garcinia mangostana*. *J Nat Prod*. 2001;64(7):903–6.
78. Sen AK, Sarkar KK, Majunder PC, Benerji N. Isolation of Three New Minor Xanthonones from *Garcinia mangostana* Linn. *Indian Journal Chemistry*. 1980;19B:1008.

79. Gopalakrishnan G, Banumathi B, Suresh G. Evaluation of the Antifungal Activity of Natural Xanthenes from *Garcinia mangostana* and Their Synthetic Derivatives. *J Nat Prod.* 1997;60(5):519–24.
80. Govindachari TR, Kalyanaraman PS, Muthukumaraswamy N, Pai BR. Xanthenes of *Garcinia mangostana* Linn. *Tetrahedron.* 1971;27(16):3919–26.
81. Balasubramanian K, Rajagopalan K. Novel xanthenes from *Garcinia mangostana*, structures of BR-xanthone-A and BR-xanthone-B. *Phytochemistry.* 1988;27(5):1552–4.
82. Jung HA, Su BN, Keller WJ, Mehta RG, Kinghorn AD. Antioxidant Xanthenes from the Pericarp of *Garcinia mangostana* (Mangosteen). *J Agric Food Chem.* 2006;54(56):2077–82.
83. Suksamrarn S, Suwannapoch N, Ratananukul P, Aroonlerk N, Suksamrarn A. Xanthenes from the Green Fruit Hulls of *Garcinia mangostana*. *J Nat Prod.* 2002;65(5):761–3.
84. Sen AK, Uusvuori R, Hase TA, Banerji N, Sarkar KK, Mazumder PC. A Xanthone from *Garcinia mangostana*. *Phytochemistry.* 1980;19:2223–5.
85. Sen AK, Sarkar KK, Mazumder PC, Banerji N, Uusvuori R, Hase TA. The Structures of Garcinones A, B and C: Three New Xanthenes from *Garcinia mangostana*. *Phytochemistry.* 1982;21(7):1747–50.
86. Sen AK, Sarkar KK, Mazumder PC, Banerji N. Garcinone D A New Xanthone from *Garcinia mangostana* linn. *Indian J Chem.* 1986;25(11):1157–8.
87. Dutta P, Sem A, Sarkar K, Banerji N. Acid-catalysed Cyclisations of Xanthenes: Structure of New Xanthone from *Garcinia mangostana* Linn. *Indian Journal Chemistry.* 1987;26B:281–2.
88. Sakai S, Katsura M, Takayama H, Aimi N, Chokethaworn N, Suttajit M. The Structure of Garcinone E. *Chem Pharm Bull (Tokyo).* 1993;41:958–60.
89. Suksamrarn S, Suwannapoch N, Phakhodee W, Thanuhiranlert J, Ratananukul P, Chimnoi N, et al. Antimycobacterial Activity of Prenylated Xanthenes from the Fruits of *Garcinia mangostana*. *Chem Pharm Bull (Tokyo).* 2003;51(7):857–9.
90. Matsumoto K, Akao Y, Kobayashi E, Ohguchi K, Ito T, Tanaka T, et al. Induction of Apoptosis by Xanthenes from Mangosteen in Human Leukemia Cell Lines. *J Nat Prod.* 2003;66(8):1124–7.
91. Ho CK, Huang YL, Chen CC. Garcinone E, a Xanthone Derivative, has Potent Cytotoxic Effect Against Hepatocellular Carcinoma Cell Lines. *Planta Med.* 2002 Nov;68(11):975–9.
92. Iinuma M, Tosa H, Tanaka T, Asai F, Kobayashi Y, Shimano R, et al. Antibacterial Activity of Xanthenes from Guttiferaceous Plants against Methicillin-resistant *Staphylococcus aureus*. *Journal of Pharmacy and Pharmacology.* 2011;48(8):861–5.
93. Kurniawan YS, Priyanga KTA, Jumina, Pranowo HD, Sholikhah EN, Zulkarnain AK, et al. An Update on the Anticancer Activity of Xanthone Derivatives: A review. *Pharmaceuticals.* 2021;14(11):1–39.

94. Zhou BD, Zeng LL, Tong YG, Fang JY, Ruan ZP, Zeng XY, et al. Synthesis and Antitumor, Antityrosinase, and Antioxidant Activities of Xanthone. *J Asian Nat Prod Res.* 2018;20(5):467–76.
95. Rząd K, Ioannidi R, Marakos P, Pouli N, Olszewski M, Kostakis IK, et al. Xanthone Synthetic Derivatives with High Anticandidal Activity and Positive Mycostatic Selectivity Index Values. *Sci Rep.* 2023;13(1):1–13.
96. Dean B, Cooper G, Shivkumar M, Snape TJ. Hydroxy-Xanthenes as Promising Antiviral Agents: Synthesis and Biological Evaluation Against Human Coronavirus OC43. *Bioorg Med Chem Lett.* 2023;84:1–6.
97. Felicia Karnadi AN, Kok T. Anti-inflammatory Potential of Mangosteen Pericarp Extract (*Garcinia mangostana* L.). *Fitofarmaka: Jurnal Ilmiah Farmasi.* 2023;13(1):42–9.
98. Chairungsrilerd N, Furukawa KI, Ohta T, Nozoe S, Ohizumi Y. Pharmacological Properties of α -mangostin, a Novel Histamine H1 Receptor Antagonist. *Eur J Pharmacol.* 1996;314:351–6.
99. Cui J, Hu W, Cai Z, Liu Y, Li S, Tao W, et al. New Medicinal Properties of Mangostins: Analgesic Activity and Pharmacological Characterization of Active Ingredients From the Fruit Hull of *Garcinia mangostana* L. *Pharmacol Biochem Behav.* 2010;95(2):166–72.
100. Oberholzer I, Möller M, Holland B, Dean OM, Berk M, Harvey BH. *Garcinia mangostana* Linn Displays Antidepressant-Like and Pro-Cognitive Effects in A Genetic Animal Model of Depression: A Bio-Behavioral Study in The Flinders Sensitive Line Rat. *Metab Brain Dis.* 2018;33(2):467–80.
101. Quan X, Wang Y, Ma X, Liang Y, Tian W, Ma Q, et al. α -Mangostin Induces Apoptosis and Suppresses Differentiation of 3T3-L1 Cells via Inhibiting Fatty Acid Synthase. *PLoS One.* 2012;7(3):1–10.
102. Husen SA, Kalqutny SH, Nur A, Ansori M, Joko R, Susilo K, et al. Antioxidant and Antidiabetic Activity of *Garcinia mangostana* L. Pericarp Extract in Streptozotocin-Induced Diabetic Mice. *Bioscience Research.* 2017;14(4):1238–45.
103. Suksamrarn S, Suwannapoch N, Phakhodee W, Thanuhiranlert J, Ratananukul piniti, Chimnol N, et al. Antimycobacterial Activity of Prenylated Xanthenes from the Fruits of *Garcinia mangostana*. *Chem Pharm Bull.* 2003;51(7):857–9.
104. Chomnawang MT, Surassmo S, Nukoolkarn VS, Gritsanapan W. Antimicrobial Effects of Thai Medicinal Plants Against Acne-Inducing Bacteria. *J Ethnopharmacol.* 2005;101:330–3.
105. Radji M, Sumiati A, Rachmayani R, Elya B. Isolation of Fungal Endophytes from *Garcinia mangostana* and Their Antibacterial Activity. *Afr J Biotechnol.* 2011;10(1):103–7.
106. Utami P. Antibiotik Alami untuk Mengatasi Aneka Penyakit. Jakarta Selatan: PT AgroMedia Pustaka; 2012. 1–123 p.

107. Upmanyu N, Malviya VN. Antibiotics: Mechanisms of Action and Modern Challenges. In: *Microorganisms for Sustainable Environment and Health*. Elsevier; 2020. p. 367–82.
108. Demeke CA, Adinew GM, Abebe TB, Gelaye AT, Gemeda SG, Yimenu DK. Comparative Analysis of the Effectiveness of Narrow-Spectrum Versus Broad-Spectrum Antibiotics for the Treatment of Childhood Pneumonia. *SAGE Open Med*. 2021;9:1–7.
109. Coates A, Hu Y, Bax R, Page C. The Future Challenges Facing The Development of New Antimicrobial Drugs. *Nat Rev Drug Discov*. 2002;1(11):895–910.
110. Anggita D, Nuraisyah S, Wiriansya EP. Mekanisme Kerja Antibiotik. *UMI Medical Journal*. 2022;7(1):46–58.
111. Silver LL. Novel Inhibitors of Bacterial Cell Wall Synthesis. *Curr Opin Microbiol*. 2003;6(5):431–8.
112. Purwanto, Irianto IDK. *Senyawa Alam Sebagai Antibakteri dan Mekanisme Aksinya*. Yogyakarta: Gajah Mada University Press; 2022. 1–150 p.
113. Sarkar P, Yarlagadda V, Ghosh C, Haldar J. A Review on Cell Wall Synthesis Inhibitors with an Emphasis on Glycopeptide Antibiotics. *The Royal Society of Chemistry*. 2017;8(3):516–33.
114. Radji M. *Mekanisme Aksi Molekuler Antibiotik dan Kemoterapi*. Jakarta: Penerbit Buku Kedokteran EGC; 2014. 1–281 p.
115. Agirrezabala X, Frank J. From DNA to Proteins Via The Ribosome: Structural Insights Into The Workings of The Translation Machinery. *Hum Genomics*. 2010;4(4):226.
116. Muntasir, Abdulkadir WS, Harun AI, Tenda E, Makkasau, Mulyadi, et al. *Antibiotik dan Resistensi Antibiotik*. Yogyakarta: Rizmedia Pustaka Indonesia; 2021. 1–210 p.
117. Khan T, Sankhe K, Suvarna V, Sherje A, Patel K, Dravyakar B. DNA Gyrase Inhibitors: Progress and Synthesis of Potent Compounds as Antibacterial Agents. *Biomedicine & Pharmacotherapy*. 2018;103:923–38.
118. Khan T, Sankhe K, Suvarna V, Sherje A, Patel K, Dravyakar B. DNA Gyrase Inhibitors: Progress and Synthesis of Potent Compounds as Antibacterial Agents. *Biomedicine and Pharmacotherapy*. 2018;103:923–38.
119. Hawser S, Lociuro S, Islam K. Dihydrofolate Reductase Inhibitors as Antibacterial Agents. *Biochem Pharmacol*. 2006;71(7):941–8.
120. Fernández-Villa D, Aguilar MR, Rojo L. Folic Acid Antagonists: Antimicrobial and Immunomodulating Mechanisms and Applications. *Int J Mol Sci*. 2019;20(20):4996.

121. Martin JF, Alvarez-Alvarez R, Liras P. Penicillin-Binding Proteins, β -Lactamases, and β -Lactamase Inhibitors in β -Lactam-Producing Actinobacteria: Self-Resistance Mechanisms. *Int J Mol Sci.* 2022;23(10):5662.
122. He J, Qiao W, An Q, Yang T, Luo Y. Dihydrofolate Reductase Inhibitors for Use as Antimicrobial Agents. *Eur J Med Chem.* 2020;195:112268.
123. Mehta R, Champney WS. 30S Ribosomal Subunit Assembly Is a Target for Inhibition by Aminoglycosides in *Escherichia coli*. *Antimicrob Agents Chemother.* 2002;46(5):1546–9.
124. Ramírez D, Caballero J. Is It Reliable to Take the Molecular Docking Top Scoring Position as the Best Solution without Considering Available Structural Data? *Molecules.* 2018;23(5).
125. Du X, Li Y, Xia YL, Ai SM, Liang J, Sang P, et al. Insights Into Protein–Ligand Interactions: Mechanisms, Models, and Methods. *Int J Mol Sci.* 2016 Jan 26;17(2).
126. Sauvage E, Kerff F, Terrak M, Ayala JA, Charlier P. The Penicillin-Binding Proteins: Structure and Role in Peptidoglycan Biosynthesis. *FEMS Microbiol Rev.* 2008 Mar;32(2):234–58.
127. Wróbel A, Arciszewska K, Maliszewski D, Drozdowska D. Trimethoprim and Other Nonclassical Antifolates an Excellent Template for Searching Modifications of Dihydrofolate Reductase Enzyme Inhibitors. *Journal of Antibiotics.* 2020 Jan 1;73(1):5–27.
128. Collin F, Karkare S, Maxwell A. Exploiting Bacterial DNA Gyrase as a Drug Target: Current State and Perspectives. *Appl Microbiol Biotechnol.* 2011 Nov;92(3):479–97.
129. Lin J, Zhou D, Steitz TA, Polikanov YS, Gagnon MG. Annual Review of Biochemistry Ribosome-Targeting Antibiotics: Modes of Action, Mechanisms of Resistance, and Implications for Drug Design. *Annu Rev Biochem.* 2018;14(6):1–28.
130. Chen D, Oezguen N, Urvil P, Ferguson C, Dann SM, Savidge TC. Regulation of Protein-Ligand Binding Affinity by Hydrogen Bond Pairing. *Sci Adv.* 2016 Mar 1;2(3):1–16.
131. Bosshard HR, Marti DN, Jelesarov I. Protein Stabilization by Salt Bridges: Concepts, Experimental Approaches and Clarification of Some Misunderstandings. *Journal of Molecular Recognition.* 2004;17(1):1–16.
132. Zhuang WR, Wang Y, Cui PF, Xing L, Lee J, Kim D, et al. Applications of π - π stacking interactions in the design of drug-delivery systems. *Journal of Controlled Release.* 2019 Jan 28;294:311–26.
133. Infield DT, Rasouli A, Galles GD, Chipot C, Tajkhorshid E, Ahern CA. Cation- π Interactions and their Functional Roles in Membrane Proteins: Cation- π interactions in membrane proteins. Vol. 433, *Journal of Molecular Biology.* Academic Press; 2021.

134. Suárez-Castro A, Valle-Sánchez M, Cortés-García CJ, Chacón-García L. Molecular Docking in Halogen Bonding. In: Molecular Docking. InTech; 2018.
135. Spassov DS, Atnasova M, Doytchinova I. A Role of Salt Bridges in Mediating Drug Potency: A Lesson From The N-Myristoyltransferase Inhibitors. *Front Mol Biosci.* 2023;9(1066029):1–15.
136. Ulayya HF, Nursayyida A, Atmaja FI, Santoso B. Study of Virtual Molecular Docking of Avocados Compounds against *Pseudomonas aeruginosa* (5N5H) by Carbapenemase using DOCK 6 Algorithm. *JKPK (Jurnal Kimia dan Pendidikan Kimia).* 2021 Aug 27;6(2):183.
137. Gjorgjieva M, Tomašič T, Kikelj D, Mašič LP. Benzothiazole-based Compounds in Antibacterial Drug Discovery. *Curr Med Chem.* 2019 Jan 7;25(38):5218–36.
138. Chae SY, Jang MK, Nah JW. Influence of molecular weight on oral absorption of water soluble chitosans. *Journal of Controlled Release.* 2005;102(2):383–94.
139. Kimura T, Higaki K. Gastrointestinal Transit and Drug Absorption. *Biol Pharm Bull.* 2002;25(2):149–64.
140. Wu D, Chen Q, Chen X, Han F, Chen Z, Wang Y. The Blood–Brain Barrier: Structure, Regulation, and Drug Delivery. *Signal Transduct Target Ther.* 2023;8(1):1–22.
141. Begley DJ. Delivery of Therapeutic Agents to The Central Nervous System: The Problems and The Possibilities. *Pharmacol Ther.* 2004;104(1):29–45.
142. Durán-Iturbide NA, Díaz-Eufracio BI, Medina-Franco JL. In Silico ADME/Tox Profiling of Natural Products: A Focus on BIOFACQUIM. *ACS Omega.* 2020 Jul 7;5(26):16076–84.
143. Guengerich FP. Cytochrome P450 and Chemical Toxicology. *Chem Res Toxicol.* 2008;21(1):70–83.
144. Prior TI, Baker GB. Interactions Between The Cytochrome P450 System and The Second-Generation Antipsychotics. *J Psychiatry Neurosci.* 2003;28(2):99–112.
145. ProTox-3.0 - Prediction of TOXicity of chemicals [Internet]. [cited 2024 Jun 26]. Available from: <https://tox.charite.de/protox3/>