

DAFTAR PUSTAKA

- Abaza, A., Vasavada, A. M., Sadhu, A., Valencia, C., Fatima, H., Nwankwo, I., Anam, M., Maharjan, S., Amjad, Z., and Khan, S. (2022). A Systematic Review of Apoptosis in Correlation With Cancer: Should Apoptosis Be the Ultimate Target for Cancer Treatment? *Cureus*. <https://doi.org/10.7759/cureus.28496>
- Abdelwahab, A. A., Elattar, M. A., & Fawzi, S. A. (2025). Advancing ADMET prediction for major CYP450 isoforms: Graph-based models, limitations, and future directions. *BioMedical Engineering OnLine*, 24(1):93. <https://doi.org/10.1186/s12938-025-01412-6>
- Akifah, M. N., Damara, D. S., Putri, I. S., and Utami, M. R. (2025). Literature Review: Comparison of Activity of Chemical Compounds with Potential as Oral Breast Cancer Drug Candidates Using the In Silico Method. *Journal of Pharmaceutical and Sciences*, 8(4).
- Alsedfy, M. Y., Ebnalwaled, A. A., Moustafa, M., and Said, A. H. (2024). Investigating the binding affinity, molecular dynamics, and ADMET properties of curcumin-IONPs as a mucoadhesive bioavailable oral treatment for iron deficiency anemia. *Scientific Reports*, 14(1):22027. <https://doi.org/10.1038/s41598-024-72577-8>
- Amrulloh, L. S. W. F., Harmastuti, N., Prasetyo, A., and Herowati, R. (2023). Analysis of Molecular Docking and Dynamics Simulation of Mahogany (*Swietenia macrophylla* King) Compounds Against the PLpro Enzyme SARS-COV-2. *Jurnal Farmasi dan Ilmu Kefarmasian Indonesia*, 10(3): 347–359. <https://doi.org/10.20473/jfiki.v10i32023.347-359>
- Antil, S., Abraham, J. S., Sripoorna, S., Maurya, S., Dagar, J., Makhija, S., Bhagat, P., Gupta, R., Sood, U., Lal, R., and Toteja, R. (2023). DNA barcoding, an effective tool for species identification: A review. *Molecular Biology Reports*, 50(1):761–775. <https://doi.org/10.1007/s11033-022-08015-7>
- Assalve, G., Lunetti, P., Fai, A., Terlizzi, A., Zara, V., and Ferramosca, A. (2025). Marine Algal Metabolites as Cellular Antioxidants: A Study of Caulerpin

- and Caulerpinic Acid in *Saccharomyces cerevisiae*. *Marine Drugs*, 23(9): 338. <https://doi.org/10.3390/md23090338>
- Câmara, J. S., Perestrelo, R., Ferreira, R., Berenguer, C. V., Pereira, J. A. M., and Castilho, P. C. (2024). Plant-Derived Terpenoids: A Plethora of Bioactive Compounds with Several Health Functions and Industrial Applications—A Comprehensive Overview. *Molecules*, 29(16):3861. <https://doi.org/10.3390/molecules29163861>
- Chagas, C. M., Moss, S., and Alisaraie, L. (2018). Drug metabolites and their effects on the development of adverse reactions: Revisiting Lipinski's Rule of Five. *International Journal of Pharmaceutics*, 549(1–2), 133–149. <https://doi.org/10.1016/j.ijpharm.2018.07.046>
- Christoper, I., Sounderraajan, A., Murugesan, V., Sabapathy, I., Periyasamy, V., & Manikkam, R. (2023). Molecular docking analysis of triterpenoids from *Cassia fistula* with breast cancer targets. *Bioinformation*, 19(11):1067–1074. <https://doi.org/10.6026/973206300191067>
- Coppejans, E., and Beeckman, T. (1989). Caulerpa section Sedoideae (Chlorophyta, Caulerpales) from the Kenyan coast. *Nova Hedwigia*, 49:381–393.
- Flores-Holguín, N., Frau, J., and Glossman-Mitnik, D. (2021). In Silico Pharmacokinetics, ADMET Study and Conceptual DFT Analysis of Two Plant Cyclopeptides Isolated From Rosaceae as a Computational Peptidology Approach. *Frontiers in Chemistry*, 9:708364. <https://doi.org/10.3389/fchem.2021.708364>
- Franz, A. K., & Wilson, S. O. (2013). Organosilicon Molecules with Medicinal Applications. *Journal of Medicinal Chemistry*, 56(2):388–405. <https://doi.org/10.1021/jm3010114>
- Frazzini, S., and Rossi, L. (2025). Anticancer Properties of Macroalgae: A Comprehensive Review. *Marine Drugs*, 23(2):70. <https://doi.org/10.3390/md23020070>
- Freihat, O., Sipos, D., and Kovacs, A. (2025). Global burden and projections of breast cancer incidence and mortality to 2050: A comprehensive analysis of GLOBOCAN data. *Frontiers in Public Health*, 13:1622954. <https://doi.org/10.3389/fpubh.2025.1622954>

- Gildantia, E., Ferniah, R. S., Budiharjo, A., Supriyadi, A., Zainuri, M., and Kusumaningrum, H. P. (2022). Identifikasi Spesies Mikroalga dari BBPBAP Jepara secara Morfologi dan Molekuler menggunakan 18S rDNA. *Buletin Oseanografi Marina*, 11(2):167–176. <https://doi.org/10.14710/buloma.v11i2.39703>
- Guan, L., Yang, H., Cai, Y., Sun, L., Di, P., Li, W., Liu, G., and Tang, Y. (2019). ADMET-score – a comprehensive scoring function for evaluation of chemical drug-likeness. *MedChemComm*, 10(1):148–157. <https://doi.org/10.1039/C8MD00472B>
- Gulcin, İ., and Alwasel, S. H. (2023). DPPH Radical Scavenging Assay. *Processes*, 11(8):2248. <https://doi.org/10.3390/pr11082248>
- Hadi, S., Salma, S., Khairunnisa, A., and Kamelia, S. (2022). Skrining senyawa Combretum Indicum sebagai inhibitor Caspase 3 secara In Silico. *Jurnal Farmasi Sains dan Terapan*, 9(2):73–80. <https://doi.org/10.33508/jfst.v9i2.3999>
- Hidayatullah, M., Rakhmatullah, A. N., and Perdana, D. (2023). Penetapan Kadar Fenolik Total dan Flavonoid Total Ekstrak Etanol Batang Bajakah Tampala (*Spatholobus littoralis Hassk.*). *Journal of Pharmacopolium*, 6(2):41-52.
- Islam, M. T., Ali, E. S., Uddin, S. J., Shaw, S., Islam, M. A., Ahmed, M. I., Chandra Shill, M., Karmakar, U. K., Yarla, N. S., Khan, I. N., Billah, M. M., Pieczynska, M. D., Zengin, G., Malainer, C., Nicoletti, F., Gulei, D., Berindan-Neagoe, I., Apostolov, A., Banach, M., and Atanasov, A. G. (2018). Phytol: A review of biomedical activities. *Food and Chemical Toxicology*, 121:82–94. <https://doi.org/10.1016/j.fct.2018.08.032>
- Itam, A., Wati, M. S., Agustin, V., Sabri, N., Jumanah, R. A., and Efdi, M. (2021). Comparative Study of Phytochemical, Antioxidant, and Cytotoxic Activities and Phenolic Content of *Syzygium aqueum* (Burm. F. Alston f.) Extracts Growing in West Sumatera Indonesia. *The Scientific World Journal*, 1–9. <https://doi.org/10.1155/2021/5537597>
- Karami, T. K., Hailu, S., Feng, S., Graham, R., and Gukasyan, H. J. (2022). Eyes on Lipinski's Rule of Five: A New “Rule of Thumb” for Physicochemical

- Design Space of Ophthalmic Drugs. *Journal of Ocular Pharmacology and Therapeutics*, 38(1):43–55. <https://doi.org/10.1089/jop.2021.0069>
- Khuniad, C., Nahar, L., Talukdar, A. D., Nath, R., Ritchie, K. J., and Sarker, S. D. (2025). Cancer Chemopreventive Potential of *Claoxylon longifolium* Grown in Southern Thailand: A Bioassay-Guided Isolation of Vicenin 1 as the Active Compound and In Silico Studies on Related C-Glycosyl Flavones. *Molecules*, 30(15):3173. <https://doi.org/10.3390/molecules30153173>
- Klimoszek, D., Jeleń, M., Dołowy, M., and Morak-Młodawska, B. (2024). Study of the Lipophilicity and ADMET Parameters of New Anticancer Diquinothiazines with Pharmacophore Substituents. *Pharmaceutics*, 17(6):725. <https://doi.org/10.3390/ph17060725>
- Lagu, I. J. L., Nyamai, D. W., and Njeru, S. N. (2024). Phytochemical analysis, in-vitro and in-silico study of antiproliferative activity of ethyl acetate fraction of *Launaea cornuta* (Hochst. Ex Oliv. & Hiern) C. Jeffrey against human cervical cancer cell line. *Frontiers in Pharmacology*, 15:1399885. <https://doi.org/10.3389/fphar.2024.1399885>
- Lainetti, P. D. F., Leis-Filho, A. F., Laufer-Amorim, R., Battazza, A., and Fonseca-Alves, C. E. (2020). Mechanisms of Resistance to Chemotherapy in Breast Cancer and Possible Targets in Drug Delivery Systems. *Pharmaceutics*, 12(12):1193. <https://doi.org/10.3390/pharmaceutics12121193>
- Lin, J., Sahakian, D., De Moraes, S., Xu, J., Polzer, R., and Winter, S. (2003). The Role of Absorption, Distribution, Metabolism, Excretion and Toxicity in Drug Discovery. *Current Topics in Medicinal Chemistry*, 3(10):1125–1154. <https://doi.org/10.2174/1568026033452096>
- Lucena-Aguilar, G., Sánchez-López, A. M., Barberán-Aceituno, C., Carrillo-Ávila, J. A., López-Guerrero, J. A., and Aguilar-Quesada, R. (2016). DNA Source Selection for Downstream Applications Based on DNA Quality Indicators Analysis. *Biopreservation and Biobanking*, 14(4):264–270. <https://doi.org/10.1089/bio.2015.0064>
- Maeda, R., Ida, T., Ihara, H., and Sakamoto, T. (2012). Induction of Apoptosis in MCF-7 Cells by β -1,3-Xylooligosaccharides Prepared from *Caulerpa*

- lentillifera*. *Bioscience, Biotechnology, and Biochemistry*, 76(5):1032–1034. <https://doi.org/10.1271/bbb.120016>
- Manurung, H., Susanto, D., Kusumawati, E., Aryani, R., Nugroho, R. A., Kusuma, R., Rahmawati, Z., and Sari, R. D. (2022). Phytochemical, GC-MS analysis and antioxidant activities of leaf methanolic extract of Lai (*Durio kutejensis*), the endemic plant of Kalimantan, Indonesia. *Biodiversitas Journal of Biological Diversity*, 23(11). <https://doi.org/10.13057/biodiv/d231104>
- Merlin, J. P. J., Rupasinghe, H. P. V., Dellaire, G., and Murphy, K. (2021). Role of Dietary Antioxidants in p53-Mediated Cancer Chemoprevention and Tumor Suppression. *Oxidative Medicine and Cellular Longevity*, 2021(1): 9924328. <https://doi.org/10.1155/2021/9924328>
- Mishra, K., Ojha, H., & Chaudhury, N. K. (2012). Estimation of antiradical properties of antioxidants using DPPH assay: A critical review and results. *Food Chemistry*, 130(4):1036–1043. <https://doi.org/10.1016/j.foodchem.2011.07.127>
- Munteanu, I. G., & Apetrei, C. (2021). Analytical Methods Used in Determining Antioxidant Activity: A Review. *International Journal of Molecular Sciences*, 22(7):3380. <https://doi.org/10.3390/ijms22073380>
- Nivatya, H. K., Singh, A., Kumar, N., Sonam, Sharma, L., Singh, V., Mishra, R., Gaur, N., and Mishra, A. K. (2025). Assessing molecular docking tools: Understanding drug discovery and design. *Future Journal of Pharmaceutical Sciences*, 11(1):111. <https://doi.org/10.1186/s43094-025-00862-y>
- Nurhayati, A. P. D., Rihandoko, A., Fadlan, A., Ghaissani, S. S., Jadid, N., & Setiawan, E. (2022). Anti-cancer potency by induced apoptosis by molecular docking P53, caspase, cyclin D1, cytotoxicity analysis and phagocytosis activity of trisindoline 1,3 and 4. *Saudi Pharmaceutical Journal*, 30(9):1345–1359. <https://doi.org/10.1016/j.jsps.2022.06.012>
- Nurjanah, N., Jacobeb, A. M., Asmara, D. A., & Hidayat, T. (2019). Phenol Component Of Fresh And Boiled Sea Grapes (*Caulerpa* Sp.) From Tual,

- Maluku. *Food ScienTech Journal*, 1(1):31–39.
<https://doi.org/10.33512/fsj.v1i1.6244>
- Nurlina, N., Tomagola, M. I., & Angraini, R. (2018). Formulasi dan Uji Aktivitas Antioksidan Losio Ekstrak Metanol Alga Hijau *Caulerpa racemosa*. *As-Syifaa Jurnal Farmasi*, 10(01).
- Ouahabi, S., Daoudi, N. E., Chebaibi, M., Mssillou, I., Rahhou, I., Bnouham, M., Hammouti, B., Fauconnier, M.-L., Ayerdi Gotor, A., Rhazi, L., and Ramdani, M. (2025). A Comparative Study of the Phytochemical Composition, Antioxidant Properties, and In Vitro Anti-Diabetic Efficacy of Different Extracts of *Caulerpa prolifera*. *Marine Drugs*, 23(7):259.
<https://doi.org/10.3390/md23070259>
- Palaniyappan, S., Sridhar, A., Kari, Z. A., Téllez-Isaías, G., and Ramasamy, T. (2023). Evaluation of Phytochemical Screening, Pigment Content, In Vitro Antioxidant, Antibacterial Potential and GC-MS Metabolite Profiling of Green Seaweed *Caulerpa racemosa*. *Marine Drugs*, 21(5):278.
<https://doi.org/10.3390/md21050278>
- Pandey, S., and Pant, B. (2020). Establishment of in vitro cultures of valuable medicinal plant *Valeriana jatamansi* jones, its conservation and production of bioactive metabolites. *Eco. Env. & Cons*, 26(S33-8).
- Pangestuti, R., Rahmadi, P., Siahaan, E. A., Nisa, K., Poeloengasih, C. D., Kurnianto, D., & Lideman. (2025). “Sea grape”-based traditional foods in Indonesia: A glimpse into the tropical coastal culinary heritage. *Journal of Ethnic Foods*, 12(1):20. <https://doi.org/10.1186/s42779-025-00281-7>
- Pérez, M., Dominguez-López, I., and Lamuela-Raventós, R. M. (2023). The Chemistry Behind the Folin–Ciocalteu Method for the Estimation of (Poly)phenol Content in Food: Total Phenolic Intake in a Mediterranean Dietary Pattern. *Journal of Agricultural and Food Chemistry*, 71(46): 17543–17553. <https://doi.org/10.1021/acs.jafc.3c04022>
- Pirie, R., Stanway-Gordon, H. A., Stewart, H. L., Wilson, K. L., Patton, S., Tyerman, J., Cole, D. J., Fowler, K., and Waring, M. J. (2024). An analysis of the physicochemical properties of oral drugs from 2000 to 2022. *RSC*

- Medicinal Chemistry*, 15(9):3125–3132.
<https://doi.org/10.1039/D4MD00160E>
- Pudełek, M., Catapano, J., Kochanowski, P., Mrowiec, K., Janik-Olchawa, N., Czyż, J., and Ryszawy, D. (2019). Therapeutic potential of monoterpene α -thujone, the main compound of *Thuja occidentalis* L. essential oil, against malignant glioblastoma multiforme cells in vitro. *Fitoterapia*, 134:172–181. <https://doi.org/10.1016/j.fitote.2019.02.020>
- Purwaningsih, I., Maksum, I. P., Sumiarsa, D., and Sriwidodo, S. (2025). Pharmacokinetics and Toxicity Overview of Active Compounds Berberine, Palmatine, and Jatrorrhizine From *Fibraurea tinctoria* Lour: Drug-Likeness, ADMET Prediction, and In Vivo Extract Toxicity Assessment. *Journal of Toxicology*, 2025(1):7251602. <https://doi.org/10.1155/jt/7251602>
- Rahmah, V. A., Tanuwiria, U. H., and Islami, R. Z. (2025). Konsentrasi dan Kemurnian DNA Hasil Ekstraksi Rumput Odot, Jagung Hibrida, Padi IR64 dan Padi Ciherang. *Agrinimal Jurnal Ilmu Ternak dan Tanaman*, 13(2): 119–126. <https://doi.org/10.30598/ajitt.2025.13.2.119-126>
- Rahman, S. M., Neaz, S., Alam, M. M., and Nur, J. (2019). Hypolipidemic activity of ethanolic extract of *Caulerpa racemosa*. *BIRDEM Medical Journal*, 9(3):197-201.
- Rangkuti, A. B., Mawarni, A., and Rangkuti, R. R. (2022). Phylogenetic reconstruction of tree species on the University of North Sumatra Campus, based on the rbcL gene. *IOP Conference Series: Earth and Environmental Science*, 1115(1):012030. <https://doi.org/10.1088/1755-1315/1115/1/012030>
- Resztak, M., and Czyrski, A. (2024). The Determination of LogP of Anticoagulant Drugs with High-Performance Thin-Layer Chromatography. *Processes*, 12(8):1599. <https://doi.org/10.3390/pr12081599>
- Salmasfattah, N., Dhiani, B. A., Muslikh, F. A., and Putra, G. S. (2025). Virtual Screening and Comparison of the Binding Effectiveness of Doxorubicin, Paclitaxel, and Ergoloid to ER β -MDM2 Complex Protein as New Breast

- Cancer Drug Candidates. *Indonesian Journal of Cancer*, 19(2):275–281.
<https://doi.org/10.33371/ijoc.v19i2.1325>
- Sandjaya, G., Dewi, E. N., and Purwanti, F. (2025). Total Phenols, Flavonoids, Antioxidant Activity of Methanolic and Ethyl Acetate Extracts of *Caulerpa racemosa* Plants Grown in Usaha Jaya Village, Raja Ampat Regency, Southwest Papua Province. *Asian Journal of Current Research*, 10(1):102–113. <https://doi.org/10.56557/ajocr/2025/v10i19090>
- Sanger, G., Wonggo, D., Taher, N., Dotulong, V., Setiawan, A. A., Permatasari, H. K., Maulana, S., Nurkolis, F., Tsopmo, A., and Kim, B. (2023). Green seaweed *Caulerpa racemosa*—Chemical constituents, cytotoxicity in breast cancer cells and molecular docking simulation. *Journal of Agriculture and Food Research*, 12:100621. <https://doi.org/10.1016/j.jafr.2023.100621>
- Söhnen, M., Mandl, H., Prasad, R., da Costa, B. B., Kunzmann, A., and Springer, K. (2025). Potential use of Fiji sea grapes, *Caulerpa racemosa* “nama”: ecophysiological and biochemical investigations. *Discover Food*, 5(1):297.
- Soltif, N., Budianto, A. B., dan Irwandi, I. (2025). Uji aktivitas antioksidan dan formulasi masker gel peel off ekstrak anggur laut (*Caulerpa racemose*) kombinasi madu. *Jurnal Kesehatan Tambusai*, 6(1):2438-2446.
- Spasov, D. S. (2024). Binding Affinity Determination in Drug Design: Insights from Lock and Key, Induced Fit, Conformational Selection, and Inhibitor Trapping Models. *International Journal of Molecular Sciences*, 25(13): 7124. <https://doi.org/10.3390/ijms25137124>
- Sukoco, H., Suriansyah, S., Salmin, S., Cahyani, A. P., Andanawari, S., Akbarrizki, M., and Siswanto, F. M. (2024). Desain Primer In Silico Untuk Analisis Ekspresi Gen Osteopontin (OPN) Sebagai Penanda Kesuburan Pada Kambing Jantan (*Capra hircus*). *Jurnal Biotek*, 12(2):129–143. <https://doi.org/10.24252/jb.v12i2.49469>
- Sumarni, F., Saleh, C., and Pratiwi, D. R. (2019). Phytochemical Test and Antioxidant Activity (DPPH Method) From Leaves of Biriba (*Rollinia mucosa*(Jacq.) Baill.). *Jurnal Atomik*, 4(1):9-13.
- Svärd, A. A., Viberg, E., Von Platen, I., Jönsson, I., Lundgren, M., Ramelius, A., Andersson, C., Bennet, R., Ask, M., Bremer, J., Brundin, C., Cilio, C.,

- Elding Larsson, H., Hansson, C., Hansson, G., Ivarsson, S., Jonsdottir, B., Jonsson, I., and Neiderud, J. (2025). Feasibility of extracting usable DNA from blood samples stored up to 21 years in the DiPiS study. *Scientific Reports*, 15(1):25637. <https://doi.org/10.1038/s41598-025-08257-y>
- Tapotubun, A. M., Matrutty, T. E. A. A., Riry, J., Tapotubun, E. J., Fransina, E. G., Mailoa, M. N., Riry, W. A., Seta, B., and Rieuwpassa, F. (2020). Seaweed *Caulerpa* sp position as functional food. *IOP Conference Series: Earth and Environmental Science*, 517(1):012021. <https://doi.org/10.1088/1755-1315/517/1/012021>
- Wanandi, S. I., Limanto, A., Yunita, E., Syahrani, R. A., Louisa, M., Wibowo, A. E., and Arumsari, S. (2020). In silico and in vitro studies on the anti-cancer activity of andrographolide targeting survivin in human breast cancer stem cells. *PLOS ONE*, 15(11):e0240020. <https://doi.org/10.1371/journal.pone.0240020>
- Wirawan, I. G. P., Dewi, N. K. E. S., Sasadara, M. M. V., Sunyamurthi, I. G. N. A., Jawi, I. M., Wijaya, I. N., Darmawati, I. A. P., Suada, I. K., and Krisnandika, A. A. K. (2022). Phytochemical Analysis and Molecular Identification of Green Macroalgae *Caulerpa* spp. From Bali, Indonesia. *Molecules*, 27(15):4879. <https://doi.org/10.3390/molecules27154879>
- Wu, Q., and Huang, S.-Y. (2023). HCovDock: An efficient docking method for modeling covalent protein–ligand interactions. *Briefings in Bioinformatics*, 24(1):bbac559. <https://doi.org/10.1093/bib/bbac559>
- Yap, W.-F., Tay, V., Tan, S.-H., Yow, Y.-Y., and Chew, J. (2019). Decoding Antioxidant and Antibacterial Potentials of Malaysian Green Seaweeds: *Caulerpa racemosa* and *Caulerpa lentillifera*. *Antibiotics*, 8(3):152. <https://doi.org/10.3390/antibiotics8030152>
- Zhao, Z., Wang, J., Kong, W., Newton, M. A., Burkett, W. C., Sun, W., Buckingham, L., O'Donnell, J., Suo, H., Deng, B., Shen, X., Zhang, X., Hao, T., Zhou, C., and Bae-Jump, V. L. (2024). Palmitic Acid Exerts Anti-Tumorigenic Activities by Modulating Cellular Stress and Lipid Droplet Formation in Endometrial Cancer. *Biomolecules*, 14(5):601. <https://doi.org/10.3390/biom14050601>

Zubia, M., Draisma, S. G. A., Morrissey, K. L., Varela-Álvarez, E., and De Clerck, O. (2020). Concise review of the genus *Caulerpa* J.V. Lamouroux. *Journal of Applied Phycology*, 32(1):23–39. <https://doi.org/10.1007/s10811-019-01868-9>