

## DAFTAR PUSTAKA

- Alam, M. S., Dyck, R., Janzen, B., Karunanayake, C., Dosman, J., & Pahwa, P. (2020). Risk factors, incidence, and prevalence of diabetes among rural farm and non-farm residents of Saskatchewan, Canada; a population-based longitudinal cohort study. *Journal of Diabetes & Metabolic Disorders*, 19(2), 1563–1582.
- Ali, H., Houghton, P. J., & Soumyanath, A. (2006).  $\alpha$ -Amylase inhibitory activity of some Malaysian plants used to treat diabetes; with particular reference to *Phyllanthus amarus*. *Journal of Ethnopharmacology*, 107(3), 449–455.
- Alqahtani, F. Y., Aleanizy, F. S., El Hadi Mohamed, R. A., Fareed, N., Alqahtani, J. M., & Mahdi, W. A. (2021). Alpha-amylase inhibition and antioxidant activity of novel chalcones: Synthesis and in vitro studies. *Molecules*, 26(8), 2212.
- American Diabetes Association. (2022). 2. Classification and diagnosis of diabetes: Standards of medical care in diabetes—2022. *Diabetes Care*, 45 (Suppl 1), S17–S38.
- Atkinson, M. A., Eisenbarth, G. S., & Michels, A. W. (2014). *Type 1 diabetes*. *Lancet* (London, England), 383(9911), 69–82.
- Banerjee, P., Eckert, A. O., Schrey, A. K., & Preissner, R. (2018). ProTox-II: A webserver for the prediction of toxicity of chemicals. *Nucleic Acids Research*, 46(W1), W257–W263.
- Bischoff, H. (1994). Pharmacology of  $\alpha$ -glucosidase inhibition. *European Journal of Clinical Investigation*, 24(Suppl 3), 3–10.
- Blanch, H. W., Clark, D. S., & H. W. Blanch. (2001). *Biochemical Engineering*. Marcel Dekker.
- Brayer, G. D., Sidhu, G., Maurus, R., et al. (2000). Subsite mapping of the human pancreatic  $\alpha$ -amylase active site through structural, kinetic, and mutagenesis techniques. *Biochemistry*, 39(31), 9916–9931.
- Brownlee, M. (2005). The pathobiology of diabetic complications: A unifying mechanism. *Diabetes*, 54(6), 1615–1625.
- Ceriello, A., & Esposito, K. (2012). The role of oxidative stress in the pathogenesis of type 2 diabetes and cardiovascular diseases: Eggs or chicken? *Diabetologia*, 55(9), 2301–2303.

- Chevalier, F. dan N. Sommerer. (2011). Analytical Methods: Mass Spectrometric Methods. *Encyclopedia of Dairy Sciences*, 2: 198-205
- Chiasson, J. L., Josse, R. G., Gomis, R., Hanefeld, M., Karasik, A., & Laakso, M. (2002). Acarbose for prevention of type 2 diabetes mellitus: The STOP-NIDDM randomized trial. *The Lancet*, 359(9323), 2072–2077.
- Christie, William W. dan Xianlin Han. (2010). *Lipid Analysis Isolation, Separation, Identification and Lipidomic Analysis (4th Edition)*. Cambridge: Woodhead Publishing
- Clark, D. E. (1999). Rapid calculation of polar molecular surface area and its application to the prediction of transport phenomena. *Journal of Pharmaceutical Sciences*, 88(8), 807–814.
- Colberg, S. R., Sigal, R. J., Yardley, J. E., Riddell, M. C., Dunstan, D. W., Dempsey, P. C., & Tate, D. F. (2016). Physical activity/exercise and diabetes: A position statement of the American Diabetes Association. *Diabetes Care*, 39(11), 2065–2079.
- Cos, P., Vlietinck, A. J., Berghe, D. V., & Maes, L. (2006). Anti-infective potential of natural products: How to develop a stronger in vitro ‘proof-of-concept’. *Journal of Ethnopharmacology*, 106(3), 290–302.
- Cox, G., Smith, D. C., & Winkler, U. (2005). Metabolite Exchange in Lichen Symbiosis. *Journal of Lichenology*, 37(3), 285-297.
- Cushnie, T. P. T., & Lamb, A. J. (2011). Recent advances in understanding the antibacterial properties of flavonoids. *International Journal of Antimicrobial Agents*, 38(2), 99–107.
- Daina, A., Michielin, O., & Zoete, V. (2017). SwissADME: A free web tool to evaluate pharmacokinetics, drug-likeness and medicinal chemistry friendliness of small molecules. *Scientific Reports*, 7, 42717.
- de Lange, P. J., & Blanchon, D. J. (2015). Lichen notes from the Kermadec Islands. II. Ramalina. *Bulletin of the Auckland Museum*, 20, 171-181.
- Deduke, C., Piercey-Normore, M. D., & Gerry, E. (2012). Pathways of Secondary Metabolism in Lichens. *The Botanical Review*, 78(2), 178-193.
- DeFronzo, R. A., Eldor, R., & Abdul-Ghani, M. (2013). Pathophysiologic approach to therapy in patients with newly diagnosed type 2 diabetes. *Diabetes Care*, 36(Suppl 2), S127–S138.
- Dewick, P. M. (2002). *Medicinal natural products: A biosynthetic approach (2nd ed.)*. Wiley.

- Drwal, M. N., Banerjee, P., Dunkel, M., Wettig, M. R., & Preissner, R. (2014). ProTox: A web server for the in silico prediction of rodent oral toxicity. *Nucleic Acids Research*, 42(W1), W53-W58.
- Elix, J. A. (1996). *Biochemistry and secondary metabolites*. In T. H. Nash III (Ed.) *Liken biology* (pp. 154–180). Cambridge University Press.
- Elix, J. A., & Stocker-Worgotter, E. (2008). *Biosynthesis of Liken Substances: Evidence from Secondary Metabolites*. In T. H. Nash (Ed.), *Liken Biology* (pp. 104-133). Cambridge University Press.
- Fahselt, D. (1994). Secondary Metabolism in Likens: The Role of the Mycobiont. *Canadian Journal of Botany*, 72(1), 1-8.
- Fajarullah, A., Irawan, H., & Pratomo, A. (2014). Ekstraksi Senyawa Metabolit Sekunder Lamun Thalassodendron Ciliatum Pada Pelarut Berbeda. *Repository Umrah*, 1(1), 1-15.
- Gaucher, G. M., & Shepherd, M. G. (1968). Phenolic Biosynthesis in Likens. *Phytochemistry*, 7(6), 1113-1125.
- González, M. L., de los Ríos, A., & Ascaso, C. (2015). *Fruticose and foliose likens: Morphology and microanatomy*. In *Liken Biology: Second Edition* (pp. 49–62). Cambridge University Press.
- Guengerich, F. P. (2008). Cytochrome P450 and chemical toxicology. *Chemical Research in Toxicology*, 21(1), 70–83.
- Hanefeld, M., Schaper, F., & Koehler, C. (2004). Effect of acarbose on cardiovascular prognosis in impaired glucose tolerance. *Diabetes Care*, 27(11), 2654–2660.
- Hawksworth, D. L., & Grube, M. (2020). Likens redefined as complex ecosystems. *New Phytologist*, 227(5), 1281–1283.
- Honegger, R. (1991). Functional aspects of the liken symbiosis. *Annual Review of Plant Biology*, 42(1), 553–578.
- Houghton, P. J., Howes, M. J., Lee, C. C., & Steventon, G. (2005). Uses and abuses of in vitro tests in ethnopharmacology: Visualizing an elephant. *Journal of Ethnopharmacology*, 100(1–2), 131–138.
- Hubatsch, I., Ragnarsson, E. G. E., & Artursson, P. (2007). Determination of drug permeability and prediction of drug absorption in Caco-2 monolayers. *Nature Protocols*, 2(9), 2111–2119.
- Huneck, S. (1999). The Significance of Liken Secondary Metabolites. *Journal of Chemical Ecology*, 25(1), 1203-1232.

- Hyvärinen, M., Koopmann, R., & Hartikainen, H. (2000). Deposition of Phenolic Compounds in Lichen Cell Walls. *Physiologia Plantarum*, 109(2), 257-263.
- Inzucchi, S. E., Bergenstal, R. M., Buse, J. B., Diamant, M., Ferrannini, E., Nauck, M., & Matthews, D. R. (2015). Management of hyperglycemia in type 2 diabetes, 2015: A patient-centered approach. *Diabetes Care*, 38(1), 140–149.
- Kazeem, M. I., Ogunbiyi, J. V., & Ashafa, A. O. T. (2013). In vitro studies on the inhibition of  $\alpha$ -amylase and  $\alpha$ -glucosidase by leaf extracts of *Picralima nitida* (Stapf). *Tropical Journal of Pharmaceutical Research*, 12(5), 719–725.
- Kido, Y., Matsson, P., & Giacomini, K. M. (2011). Profiling of a prescription drug library for potential renal drug-drug interactions mediated by the organic cation transporter 2. *Journal of Medicinal Chemistry*, 54(14), 4548–4558.
- Kranner, I., Beckett, R., Hochman, A., & Nash, T. H. (2005). Desiccation-tolerance in lichens: A review. *The Bryologist*, 108(1), 13–34.
- Lawrey, J. D. (1986). Biological Role of Lichen Substances. *The Bryologist*, 89(2), 111-122.
- Ley-Martínez, J. S., Ortega-Valencia, J. E., García-Barradas, O., Jiménez-Fernández, M., Uribe-Lam, E., Vencedor-Meraz, C. I., & Oliva-Ramírez, J. (2022). Active compounds in *Zingiber officinale* as possible redox inhibitors of 5-lipoxygenase using an in silico approach. *International Journal of Molecular Sciences*, 23(11), 6093.
- Linh, N. T. T., Danova, A., Truong, T. L., Chavasiri, W., Phung, N. K. P., & Chi, H. B. L. (2020). Chemical constituents of chloroform extract from the lichen *Ramalina* sp. Arch (Ramalinaceae). *Vietnam Journal of Chemistry*, 58(2), 231-236.
- Lipinski, C. A., Lombardo, F., Dominy, B. W., & Feeney, P. J. (2001). Experimental and computational approaches to estimate solubility and permeability in drug discovery and development settings. *Advanced Drug Delivery Reviews*, 46(1–3), 3–26
- Lombardo, F., Shalaeva, M. Y., Tupper, K. A., & Gao, F. (2003). ElogD octanol–water distribution coefficients and their relationship with octanol–water partition coefficients and aqueous solubility. *Journal of Medicinal Chemistry*, 46(26), 4987–4997.

- Maghfiroh, A. N. (2020). Uji Aktivitas Antidiabetes Ekstrak Kayu Secang (*Caesalpinia Sappan L.*) Menggunakan Metode Inhibisi Enzim  $\alpha$ -Amilase Secara *in Vitro* (Doctoral dissertation).
- Marcano, D., Rosado, A., & Garrido, M. E. (2020). Lichen secondary metabolites: Potential sources of  $\alpha$ -glucosidase inhibitors. *Phytotherapy Research*, 34(4), 810–817.
- Mauliana, L., Jamil, A. S., & Rofida, S. (2022). Curcuma longa as a Natural Immunomodulator for Preventing infection from COVID 19 With an In silico Approach. *Jurnal Biologi Tropis*, 22(2), 345-352.
- Maulidiyah, M., Darmawan, A., Hasan, A., Wibowo, D., Ansharullah, A., Mustapa, F., & Nurdin, M. (2020). Isolation, structure elucidation, and antidiabetic test of vicanicin compound from lichen *Teloschistes flavicans*. *Journal of Applied Pharmaceutical Science*, 10(11), 001-009.
- McGarvey, D. J., & Croteau, R. (1995). Terpenoid metabolism. *The Plant Cell*, 7(7), 1015–1026.
- Molnar, K., & Farkas, E. (2010). Current Results on Biological Activities of Lichen Secondary Metabolites: A Review. *Zeitschrift für Naturforschung C*, 65(3-4), 157-173.
- Molyneux, R. J., Lee, S. T., Gardner, D. R., Panter, K. E., & James, L. F. (2007). Phytochemicals: The good, the bad and the ugly? *Phytochemistry*, 68(22–24), 2973–2985.
- Mosbach, K. (1969). Biosynthetic Pathways in Lichens: The Role of Shikimic Acid. *Archives of Microbiology*, 69(1), 47-55.
- Mourdikoudis, S., Pallares, R. M., & Thanh, N. T. (2018). Characterization techniques for nanoparticles: comparison and complementarity upon studying nanoparticle properties. *Nanoscale*, 10(27), 12871-12934.
- Nandiyanto, A. B. D., Ragadhita, R., & Fiandini, M. (2023). Interpretation of Fourier transform infrared spectra (FTIR): A practical approach in the polymer/plastic thermal decomposition. *Indonesian Journal of Science and Technology*, 8(1), 113-126.
- Nash, T. H. (2008). *Lichen biology (2nd ed.)*. Cambridge University Press.
- Nguyen, T. T., Shaw, P. N., & Parat, M. O. (2020). Antidiabetic properties of bioactive compounds isolated from lichens: a review. *Phytochemistry Reviews*, 19(4), 747–769.

- Nugraha, Adam dan Asep Bayu Dani Nandiyanto. (2021). How to Read and Interpret GC/MS Spectra. *Indonesian Journal of Multidisciplinary Research*, 1 (2): 171-206
- Nursamsiar, N., Mangande, M. M., Awaluddin, A., Nur, S., & Asnawi, A. (2020). In silico study of aglycon curculigoside A and its derivatives as  $\alpha$ -amilase inhibitors. *Indonesian Journal of Pharmaceutical Science and Technology*, 7(1), 29-37.
- Obach, R. S., Lombardo, F., & Waters, N. J. (2008). Trend analysis of a database of intravenous pharmacokinetic parameters in humans for 670 drug compounds. *Drug Metabolism and Disposition*, 36(7), 1385–1405.
- Ohmura, Y., Moon, K. H., & Kashiwadani, H. (2008). Morphology and molecular phylogeny of *Ramalina pollinaria*, *R. sekika* and *R. yasudae* (Ramalinaceae, likenized Ascomycotina). *Journal of Japanese Botany*, 83, 156-164.
- Pavarini, D. P., Pavarini, S. P., Niehues, M., & Lopes, N. P. (2012). Exogenous influences on plant secondary metabolite levels. *Animal Feed Science and Technology*, 176(1-4), 5–16.
- Pereira, E. C., da Silva, N. H., Santos, R. A., Sudário, A. P. P., e Silva, A. A. R., & de Sousa Maia, M. B. (2010). Determination of *Teloschistes flavicans* (sw) norm anti-inflammatory activity. *Pharmacognosy research*, 2(4), 205.
- Pires, D. E. V., Blundell, T. L., & Ascher, D. B. (2015). pkCSM: Predicting small-molecule pharmacokinetic and toxicity properties using graph-based signatures. *Journal of Medicinal Chemistry*, 58(9), 4066–4072.
- Ruthes, A. C., Komura, D. L., Carbonero, E. R., Cordeiro, L. M., Reis, R. A., Sasaki, G. L., & Iacomini, M. (2008). Polysaccharides present in cultivated *Teloschistes flavicans* symbiosis: Comparison with those of the thallus. *Plant Physiology and Biochemistry*, 46(4), 500-505.
- Saha, B. C., Bothast, R. J., & Cote, G. L. (1994). Fermentative production of polyols: Recent advances. *Advances in Applied Microbiology*, 40, 1–34.
- Saini, K. C., Nayaka, S., & Bast, F. (2019). Diversity of liken photobionts: their coevolution and bioprospecting potential. *Microbial Diversity in Ecosystem Sustainability and Biotechnological Applications: Volume 2. Soil & Agroecosystems*, 307-323.
- Sales, P. M., Souza, P. M., Simeoni, L. A., Magalhães, P. O., & Silveira, D. (2012).  $\alpha$ -Amylase inhibitors: a review of raw material and isolated compounds

- from plant source. *Journal of Pharmacy & Pharmaceutical Sciences*, 15(1), 141–183.
- Sander, T., Freyss, J., Von Korff, M., & Rufener, C. (2015). DataWarrior: An open-source program for chemistry aware data visualization and analysis. *Journal of Chemical Information and Modeling*, 55(2), 460–473.
- Sanjaya, A., Avidlyandi, A., Adfa, M., Ninomiya, M., & Koketsu, M. (2020). A new depsidone from *Teloschistes flavicans* and the antileukemic activity. *Journal of Oleo Science*, 69(12), 1591-1595.
- Schauer, P. R., Bhatt, D. L., Kirwan, J. P., Wolski, K., Aminian, A., Brethauer, S. A., ... & Nissen, S. E. (2017). Bariatric surgery versus intensive medical therapy for diabetes — 5-year outcomes. *The New England Journal of Medicine*, 376(7), 641–651.
- Shobana, S., Akhilender Naidu, K., & Ravindra, P. V. (2017). In vitro evaluation of the antidiabetic and antioxidant properties of some edible mushrooms. *Journal of the Science of Food and Agriculture*, 97(5), 1511–1520.
- Singh, G., Dal Grande, F., & Schmitt, I. (2013). Molecular studies reveal the diversity of photobionts in lichen symbioses. *Mycology*, 4(1), 1–14.
- Sipman, H. J., & Ordaya, Á. R. (2023). An ITS sequence of a specimen from the probable locus classicus of *Ramalina* sp. and its consequences. *The Lichenologist*, 55(5), 437-440.
- Spribille, T., & Resl, P. (2015). Ecology and evolution of fungal symbionts in lichens. *Advances in Botanical Research*, 75, 1–39.
- Tadtong, S., Watthanachaiyingcharoen, R., & Kamkaen, N. (2012). Antimicrobial constituents and synergism effect of the essential oils from *Cymbopogon citratus* and *Alpinia galanga*. *Natural Product Communications*, 7(9), 1231–1234.
- Taiz, L., Zeiger, E., Møller, I. M., & Murphy, A. (2015). *Plant physiology and development (6th ed.)*. Sinauer Associates.
- Taylor, R. (2013). Type 2 diabetes: Etiology and reversibility. *Diabetes Care*, 36(4), 1047–1055.
- Tundis, R., Loizzo, M. R., & Menichini, F. (2010). Natural products as  $\alpha$ -amylase and  $\alpha$ -glucosidase inhibitors and their hypoglycaemic potential in the treatment of diabetes: an update. *Mini Reviews in Medicinal Chemistry*, 10(4), 315–331.

- Van de Laar, F. A., Lucassen, P. L., Akkermans, R. P., Van de Lisdonk, E. H., Rutten, G. E., & Van Weel, C. (2008). Alpha-glucosidase inhibitors for type 2 diabetes mellitus. *Cochrane Database of Systematic Reviews*, 2008(4), CD003639.
- Vijh, D., & Gupta, P. (2024). GC–MS analysis, molecular docking, and pharmacokinetic studies on *Dalbergia sissoo* barks extracts for compounds with anti-diabetic potential. *Scientific Reports*, 14(1), 24936.
- Wahyuningsih, W., & Yulianto, M. E. (2012). Ekstraksi Asam Lemak Bebas dari Minyak Nabati dengan Metanol Kajian Perpindahan Massa. *Gema Teknologi*, 16(4), 173-176.
- Waring, R. H. (2008). Lichen Ecology and UV Protection Mechanisms. *Annals of Botany*, 101(5), 745-752.
- Wijaya, H., Jubaidah, S., & Rukayyah, R. (2022). Perbandingan Metode Esktraksi Terhadap Rendemen Ekstrak Batang Turi (*Sesbania Grandiflora* L.) Dengan Menggunakan Metode Maserasi Dan Sokhletasi. *Indonesian Journal of Pharmacy and Natural Product*, 5(1), 1-11.
- Yang, Z., Wang, Y., & Luo, H. (1993). Cyanobacterial Secondary Metabolites in Likens. *Journal of Natural Products*, 56(4), 678-683.
- Yulianingtyas, A., & Kusmartono, B. (2016). Optimasi volume pelarut dan waktu maserasi pengambilan flavonoid daun belimbing wuluh (*Averrhoa bilimbi* L.). *Jurnal Teknik Kimia*, 10(2), 61-67.