

DAFTAR PUSTAKA

- Abohatem, M., J. Zouine, & I. E. Hadrami. 2011. Low concentrations of BAP and high rate of subcultures improve the establishment and multiplication of somatic embryos in date palm suspension cultures by limiting oxidative *browning* associated with high levels of total phenols and peroxidase activities. *Scientia Horticulturae*, 130(1): 344-348.
- Admojo L., dan Indrianto A., 2016. Pencegahan *browning* fase inisiasi kalus pada kultur midrid daun klon karet (*Hevea brasiliensis* Muell Arg) Pb 330. *Indonesian Journal of Natural Rubber Research*, 34 (1): 25-34.
- Ahmad, I., & G. Alam. 2011. Analisis Hubungan Kuantitatif Struktur-Aktivitas (HKSA) dari Senyawa Aktif Antimalaria Diterpen Kassin Hasil Isolasi dari Biji Bagore (*Caesalpinia crista* Linn.) dengan Parameter Elektronik. *Journal of Tropical Pharmacy and Chemistry*, 1(2): 116–124.
- Ali, F., G. Qanmber, Z. Wei, D. Yu, Y. H. Li, L. Gen, F. Li, & Z. Wang. Genome-wide characterization and expression analysis of geranylgeranyl diphosphate synthase genes in cotton (*Gossypium* spp.) in plant development and abiotic stresses. *BMC Genomics*, 21: 561.
- Amente, G. & E. Chimdessa. 2021. Control of *browning* in plant tissue culture: A review. *Journal of Scientific Agriculture*, 5: 67-71.
- Ames, B. N., W. E. Durston, E. Yamasaki, & F. D. Lee. Carcinogens are mutagens: a simple test system combining liver homogenates for activation and bacteria for detection. *Proc. Natl. Acad. Sci. U.S.A.*, 70: 2281–2285.
- Aprianita, R. R. Esyanti, dan A. H. Siregar. 2003. Pengaruh pemberian elisitor jamur *Phytium aphanidermatum* (Edson) Fitzp. terhadap kandungan ajmalisin pada kultur kalus berakar *Catharanthus roseus* (L.) G. Don. *Berita Biologi*, 6(4): 543-547.
- Ashraf, M. A., M. Iqbal, R. Rasheed, I. Hussain, M. Riaz, M. S. Arif. 2018. *Environmental Stress and Secondary Metabolites in Plants: An Overview*, Editor(s): Parvaiz Ahmad, Mohammad Abass Ahanger, Vijay Pratap Singh, Durgesh Kumar Tripathi, Pravej Alam, Mohammed Nasser Alyemeni, Plant Metabolites and Regulation Under Environmental Stress. Academic Press, London.
- Ashokhan S, R. Othman, M.H.A. Rahim, S.A. Karsani, and J.S. Yaacob. 2020. Effect of plant growth regulators on coloured callus formation and accumulation of azadirachtin, an essential biopesticide in *Azadirachta indica*. *Plants (Basel)*, 9(352): 1-17.
- Astuty, P. & N. Komari. 2022. Kajian *molecular docking* senyawa karwinaphthol b dari tanaman bawang dayak (*Eleutherine palmifolia* (L.) Merr) sebagai inhibitor enzim glucokinase. *Jurnal Natural Science*, 2(1):
- Azman, M., A. H. Sabri, Q. K. Anjani, M. F. Mustaffa, & K. A. Hamid. 2022. Intestinal Absorption Study: Challenges and Absorption Enhancement Strategies in Improving Oral Drug Delivery. *Pharmaceuticals (Basel)*, 15(8): 975.
- Bahtiarasyah, A. A., L. Hidayati, N. Wijayanti, & T. R. Nuringtyas. 2023. Synergistic activity of *Cinnamomum burmannii* (Nees & T. Nees) Blume and

- Aquilaria malaccensis* Lamk. extracts for antidiabetic study. *Indones Biomed J.*, 15(2): 132-140.
- Banerjee, P., A. O. Eckert, A. K. Schrey, & R. Preissner. 2018. ProTox-II: a webserver for the prediction of toxicity of chemicals. *Nucleic acids research*, 46(1): 257–263.
- Basri, A. H. H. 2016. Kajian pemanfaatan kultur jaringan dalam perbanyakan tanaman bebas virus. *Agrica Ekstensi*, 10(1): 64-73.
- Bella, I., S. Rondonuwu, & A. M. Tangapo. 2022. Inventarisasi jamur mikroskopis di Perkebunan Kelapa Tengatuel Desa Tokin Baru Kecamatan Motoling Timur. *Journal of Biotechnology and Conservation in Wallace*, 2(1): 16-28.
- Bergman, M. E., Davis, B., Phillip, M. A. 2019. Medically useful plant terpenoids: biosynthesis, occurrence, and mechanism of action. *Molecules*, 24(3961): 1-23.
- Bhojwani, S. S., & P. K Dantu. 2013. *Plant Tissue Culture: An Introductory Text*. Springer India: New Delhi.
- Bhatia, S. 2015. *Plant Tissue Culture*. In: Bhatia, S., Dahiya, R., Sharma, K., & Bera, T. (Eds.), *Modern Applications of Plant Biotechnology in Pharmaceutical Sciences*. Elsevier: Amsterdam.
- Bitew, M. T. Desalegn, T. B. Demissie, A. Belayneh, M. Endale, and R. Eswaramoorthy. 2021. Pharmacokinetics and drug-likeness of antidiabetic flavonoids: Molecular docking and DFT study. *PLoS ONE*, 16(12): e0260853.
- Bratanova-Tochkova, T. K., Cheng, H., Daniel, S., Gunawardana, S., Liu, Y. J., Mulvaney-Musa, J., Schermerhorn, T., Straub, S. G., Yajima, H., & Sharp, G. W. 2002. Triggering and augmentation mechanisms, granule pools, and biphasic insulin secretion. *Diabetes*, 51(1), 83–90.
- Buitelaar, R. M., M. T. Cesario, & J. Tramper. 1991. Strategies to improve the production of secondary metabolites with plant cell cultures: a literature review. *Journal of Biotechnology*, 23: 111-141.
- Calixto, J. B. 2019. The role of natural products in modern drug discovery. *An Acad Bras Cienc.*, 91(3): e20190105.
- Candraningrat, I. D. A. A. D., A. A. G. J. Santika, I. A. M. S. Dharmayanti, & P.W. Prayascita. 2021. Review kemampuan metode GC-MS dalam identifikasi flunitrazepam terkait dengan aspek forensik dan klinik. *Jurnal Kimia (Journal of Chemistry)*, 15 (1): 12-19.
- Cao, X., T. Yin, Q. Miao, C. Li, X. Ju, Y. Sun, & J. Jiang. 2012. Molecular characterization and expression analysis of a gene encoding for farnesyl diphosphate synthase from *Euphorbia pekinensis* Rupr. *Mol Biol Rep.* 39(2): 1487-1492.
- Chasteen, T.G. 2009. *Split/Splitless Gas Chromatography Injection*. Sam Houston State University: Huntsville.
- Chen, K., X. Q. Liu, W. L. Wang, J. G. Luo, & L. Y. Kong. 2020. Taxumarienes A-G, seven new α -glucosidase inhibitory taxane-diterpenoids from the leaves of *Taxus mairei*. *Bioorganic chemistry*, 94, 103400.
- Ciocca, B.E., A.J. Munhoz, and R.M. Filho. 2021. *In silico* evaluation of most used drugs on the treatment of slight and mild covid-19 cases in Brazil. *International Journal of Development Research*, 11(06): 48146-48150.

- Cochran, J. 2015. Split injection GC: the benefits of “shoot-and-dilute” GC. *The Column*, 11: 21.
- Corduk, N., & C. Aki. 2011. Inhibition of *browning* problem during micropropagation of *Sideritis trojana* Bornm. an endemic medicinal herb of Turkey. *Romanian Biotechnological Letters*, 16(6): 6760-6765.
- Derosa, G., & P. Maffioli. α -Glucosidase inhibitors and their use in clinical practice. *Arch Med Sci.*, 8(5): 899–906.
- Dirir A. M, Daou M, Yousef AF, Yousef L. F. A review of alpha-glucosidase inhibitors from plants as potential candidates for the treatment of type-2 diabetes. *Phytochem Rev.* 2022;21(4):1049-1079.
- Doni, F., M. Miranti, M. S. Mispan, Z. Mohamed, & N. Uphoff. 2022. Multi-omics approaches for deciphering the microbial modulation of plants' genetic potentials: What's known and what's next?. *Rhizosphere*, 100613.
- Filimonov D.A., A. A. Lagunin, T. A. Glorizova, A. V. Rudik, D. S. Druzhilovskii, P. V. Pogodin, V. V. Poroikov. 2014. Prediction of the biological activity spectra of organic compounds using the PASS online web resource. *Chemistry of Heterocyclic Compounds*, 50(3): 444-457.
- Fiqa, A. P., S. Budiharta, F. A. Siahaan & R. R. Astuti. 2020. Population structure of *Gyrinops versteegii* within floristic community in Nggalak Protection Forest, Flores Island, Indonesia. *BIODIVERSITAS*, 21(4): 1561-1568.
- Freeman, V. S. 2014. Glucose and hemoglobin A1c. *Laboratory Medicine*, 45(1): 21-24.
- Frimayanti, N., A. Lukman, & L. Nathania. 2021. Studi molecular docking senyawa 1,5-benzothiazepine sebagai inhibitor dengue DEN-2 NS2B/NS3 serine protease. *Chempublish Journal*, 6(1): 54-62.
- Gong, L.X., D. N. Feng, T. X. Wang, Y. Q. Ren, Y. L. Liu, J. Wang. 2020. Inhibitors of α -amylase and α -glucosidase: Potential linkage for whole cereal foods on prevention of hyperglycemia. *Food Sci. Nutr*, 8, 6320–6337.
- Grzegorzczak-Karolak, I., Ł. Kuźma, & H. Wysokińska. 2015. The effect of cytokinins on shoot proliferation, secondary metabolite production and antioxidant potential in shoot cultures of *Scutellaria alpina*. *Plant Cell Tiss Organ Cult*, 122: 699–708.
- Grogan, S. and C.V. Preuss. 2022. *Pharmacokinetics*. StatPearls Publishing: United States.
- Gunawan, I. W. G., A. A. B. Putra, & I. A. G. Widihati. 2016. The response to oxidative stress α -Humulene compounds *Hibiscus Manihot* L leaf on the activity of 8-hydroxy-2-deoksiquanosin levels pancreatic β -cells in diabetic rats. *Biomed Pharmacol J*, 9(2): 433-441.
- Guruprasad, K., B. V. B. Reddy, & M. W. Pandit. 1990. Correlation between stability of a protein and its dipeptide composition: A novel approach for predicting in vivo stability of a protein from its primary sequence. *Protein Engineering, Design and Selection*.
- Gutierrez, R. M. P. & A. M. Ramirez. 2016. Hypoglycemic effects of sesquiterpene lactones from *Byrsonima crassifolia*. *Food Science and Biotechnology*, 25: 1135–1145.
- Herkenne, C., I. Alberti, A. Naik, Y. N. Kalia, F. X. Mathy, V. Pr  at, & R. H. Guy. 2008. In vivo methods for the assessment of topical drug bioavailability. *Pharmaceutical research*, 25(1): 87–103.

- Hartati, H., H. Agani, N. S Hartati & E. Sudarmonowati. 2018. Kecepatan Regenerasi Kalus Somatik Embriogenik Terung pada Beberapa Media Maturasi. *Jurnal Ilmu Dasar*, 19(2), pp. 125-134.
- Herber, B. E. 2003. *Thymelaeaceae. Flowering Plants Dicotyledons*. Berlin: Springer.
- Ho, B. K., & R. Brasseur. 2015. The Ramachandran plots of glycine and pre-proline. *BMC Structural Biology*, 5: 1-11.
- Hossain, U., A. K. Das, S. Ghosh & P. C. Sil. 2020. An overview on the role of bioactive α -glucosidase inhibitors in ameliorating diabetic complications. *Food and Chemical Toxicology*, 145: 111738.
- Holton, R. A., R. R. Juo, H. B. Kim, A. D. Williams, S. Harusawa, R. E. Lowenthal, S. Yogai. A synthesis of taxusin. *J. Am. Chem. Soc.*, 110: 6558-6560.
- Hu X., I. Maffucci, A. Contini. 2018. Advances in the Treatment of Explicit Water Molecules in Docking and Binding Free Energy Calculations. *Curr. Med. Chem.*, 25:1-23.
- Huang, A. 2014. *Natural Product Discovery: Studies on the Phenolic Antioxidants from Smilax Glyciphylla and the Synthesis and Formation of Guaiane Sesquiterpene* [Thesis, The University of Adelaide].
- Huang, H., F. Ullah, D. Zhou, M. Yi, & Y. Zhao. 2019. Mechanisms of ROS regulation of plant development and stress responses. *Front. Plant Sci.*, 10: 800.
- Hussain, S. Z., & K. Maqbool. 2014. GC-MS: Principle, technique and its application in food science. *Int J Curr Sci.*, 13: 116-126.
- Hutami, D. R. 2020. *Aktivitas antidiabetik ekstrak daun gaharu Gyrinops versteegii (Gilg.) Domke secara in vitro dan in silico* [Skripsi, Universitas Gadjah Mada].
- Ighodaro, O. M., F. O. Asejeje, A. M. Adeosum, T. Ujomu, & S. R. Bakre. 2019. Anti-diabetic potential and gas chromatography mass spectroscopy (GC-MS) profile of a formulated polyherbal drug (FPD). *The Journal of Phytopharmacology*, 8(3): 129-134
- International Diabetes Federation. 2021. *IDF Atlas 10th edition*. Brussels, Belgium: International Diabetes Federation.
- Joubert, P. H., H. L. Venter, & G. N. Foukaridis. 1990. The effect of miglitol and acarbose after an oral glucose load: A novel hypoglycaemic mechanism. *Br. J. clin. Pharmacol.*, 30: 391-396.
- Kaluarachchi, M., M. R. Lewis, & J. C. Lindon. 2017. Standardized Protocols for MS-Based Metabolic Phenotyping. In C. J. C. Lindon, G. E. Tranter, & D. W. Koppenaal (Eds.), *Encyclopedia of Spectroscopy and Spectrometry* (Third Edition). Academic Press, London. pp. 224-231.
- Kamaruddin, R. Titawael, & Gawariah. 2022. Kontribusi gaharu (*Aquilaria* sp) terhadap pendapatan masyarakat di Desa Fatmite Kecamatan Namrole Kabupaten Buru Selatan. *Jurnal Agrohut*, 12(1): 23-30.
- Kjobsted, R., J. R. Hingst, J. Fentz, M. Foretz, M. N. Sanz, C. Pehmoller, M. Shum, A. Marette, R. Mounier, J. T. Treebak, J. F. P. Wojtaszewski, B. Viollet, & L. Lantier. 2018. AMPK in skeletal muscle function and metabolism. *The FASEB Journal*, 32: 1741-1777.
- Komari, N., K. Anwar, & E. Suhartono. 2022. Pemodelan struktur tiga dimensi enzim superoxide dismutase (SOD) padi (*Oryza Sativa*) dengan metode fold

- recognition menggunakan web server Phyre². *Jurnal Ilmiah Berkala: Sains dan Terapan Kimia*, 16(2): 86-97.
- Kroes, R., Renwick, A. G., Cheeseman, M., Kleiner, J., Mangelsdorf, I., Piersma, A., Schilter, B., Schlatter, J., van Schothorst, F., Vos, J. G., Würtzen, G., & European branch of the International Life Sciences Institute (2004). Structure-based thresholds of toxicological concern (TTC): guidance for application to substances present at low levels in the diet. *Food and chemical toxicology: an international journal published for the British Industrial Biological Research Association*, 42(1), 65–83.
- Lagunin, A., A. Stepanchikova, D. Filimonov, & V. Poroikov. 2000. PASS: prediction of activity spectra for biologically active substances. *Bioinformatics*, 16: 747–748.
- Lagunin A.A., V. I. Dubovskaja, A. V. Rudik, P. V. Pogodin, D. S. Druzhilovskiy, T. A. Glorizova, D. A. Filimonov, G. N. Sastry, V. V. Poroikov. 2018. CLC-Pred: a freely available web-service for *in silico* prediction of human cell line cytotoxicity for drug-like compounds. *PLOS One*, 13 (1), e0191838.
- Lasuncion, M. A., J. Martinez-Botas, C. Martin-Sanchez, R. Busto, & D. Gomez-Coronado. 2021. Cell cycle dependence on the mevalonate pathway: Role of cholesterol and non-sterol isoprenoids. *Biochemical Pharmacology*: 1-17.
- Lee, H. S., J. Lee, D. Smolensky, & S. H. Lee. 2020. Potential benefits of patchouli alcohol in prevention of human diseases: A mechanistic review. *International immunopharmacology*, 89: 107056.
- Li, G., K. Shao, & C. S. Umeshappa. 2019. *Recent Progress in Blood-Brain Barrier Transportation Research*. In G. Huile & X. Gao (Eds.), *Recent progress in blood-brain barrier transportation research*. Academic Press: London.
- Loho, I. M., & I. Hasan. 2014. Drug-induced liver injury – tantangan dalam diagnosis. *Cermin Dunia Kedokteran*, 41(3): 167-170.
- Lordan, S., T. J. Smyth, A. Soler-Vila, C. Stanton, R. P. Ross. The α -amylase and α -glucosidase inhibitory effects of Irish seaweed extracts. *Food Chem.* 2013, 141, 2170–2176.
- Luni, C., J. D. Marth, & F. J. Doyle III. 2012. Computational modeling of glucose transport in pancreatic β -Cells identifies metabolic thresholds and therapeutic targets in diabetes. *PLoS ONE*, 7(12): e53130.
- Luyen, N. T., L. H. Tram, T. T. H. Hanh, P. T. Binh, N. H. Dang, C. V. Minh, & N. T. Dat. 2013. Inhibitors of α -glucosidase, α -amylase and lipase from *Chrysanthemum morifolium*. *Phytochemistry Letters*, 6: 322-325.
- Lynch, K. L. 2017. *Toxicology: liquid chromatography mass spectrometry*. In H. Nair & W. Clarke (Eds.), *Mass Spectrometry for the Clinical Laboratory*. Academic Press: London.
- Manoj, G., S. H. Manohar, & H. N. Murthy. 2012. Chemical constituents, antioxidant and antimicrobial activity of essential oil of *Pogostemon paniculatus* (Willd.). *Natural Product Research*, 26(22): 2152-2154.
- Manurung, D. I., L. Hidayati, N. Wijayanti & T. R. Nuringtyas. 2021. Metabolite profiling of agarwood (*Gyrinops versteegii* (Gilg.) Domke) leaves from difference growth locations using Thin Layer Chromatography. *Jurnal Biologi Tropis*, 21(2): 615-623.
- Marisa, F. 2021. *Induksi Pembentukan Terpenoid pada Gaharu (*Gyrinops versteegii* (Gilg.) Domke) secara In Vitro* [Tesis, Universitas Gadjah Mada].

- Mazumdar, P., A. Basu, A. Paul, C. Mahanta, & L. Sahoo. 2010. Age and orientation of the cotyledonary leaf explants determine the efficiency of de novo plant regeneration and *Agrobacterium tumefaciens*-mediated transformation in *Jatropha curcas* L. *South African Journal of Botany*, 76(2): 337-344.
- Millang, S., B. Bachtiar, & A. Makmur. 2011. Awal pertumbuhan pohon gaharu (*Gyrinops* sp.) asal Nusa Tenggara Barat di Hutan Pendidikan Universitas Hasanuddin. *Jurnal Hutan dan Masyarakat*, 6(2): 117-123.
- Misra, B. B., & S. Dey. 2013. Evaluation of in vivo anti-hyperglycemic and antioxidant potentials of α -santalol and sandalwood oil. *Phytomedicine*,
- Mohammed, A., N. Tajuddeen, M. A. Ibrahim, M. B. Isah, A. B. Aliyu, & M. S. Islam. 2022. Potential of diterpenes as antidiabetic agents: Evidence from clinical and pre-clinical studies. *Pharmacological Research*, 179: 106158.
- Mugaranja, K.P., & A. Kulal. 2020. Alpha glucosidase inhibition activity of phenolic fraction from *Simarouba glauca*: An in-vitro, in-silico and kinetic study. *Heliyon*, 6(7): e04392.
- Murkute, M., S. Patil, & S. K. Singh. 2004. In vitro regeneration in pomegranate cv. Ganesh from mature plant. *Indian Journal of Horticulture*, 61(3): 206-208.
- Muna, P. I. (2023). *Profil Terpenoid Kalus Gaharu Gyrinops versteegii* (Gilg.) Domke Hasil Elisitasi Asam Salisilat dan Potensinya sebagai Inhibitor ACE-2 [Skripsi, Universitas Gadjah Mada].
- Munasinghe, S.P., Weerakoon, S. R., Somaratne, S., & Ranasinghe, C. 2017. An Efficient Callus Induction Protocol for *Gyrinops walla* Gaetner 'Walla patta', a commercially Important Agarwood Species in Sri Lanka. *Scholars Journal of Research in Agriculture and Biology*, 2(2) : 96-102.
- Munasinghe, S., S. Somaratne, S. Weerakoon, & C. Ranasinghe. 2021. Sustainable utilization of *Gyrinops walla* Gaetner: in vitro production of sesquiterpenes by chemical and biological elicitation. *Journal of Genetic Engineering and Biotechnology*, 19: 134.
- Muthi'ah, A., A. T. Sakya, A. Setyawati, Samanhudi, & M. Rahayu. 2023. Callus induction of *Calotropis gigantea* using BAP and 2,4-D in vitro. *IOP Conf. Series: Earth and Environmental Science*, 1177: 012021.
- Naghmouchi, S., M. L. Khouja, M. N. Rejeb, & M. Boussaid. 2008. Effect of growth regulators and explant origin on in vitro propagation of *Ceratoniasiliqua* L. via cuttings. *Biotechnology, Agronomy and Society and Environment*, 12(3): 251-258.
- Nelson, D. L., & Cox, M. M. 1982. *Principles of Biochemistry*. In H.C. Aldrich and J.W. Daniel (Eds.), *In Cell Biology of Physarum and Didymium*. Academic Press: London.
- Nimse, S. B., & D. Pal. 2015. Free radicals, natural antioxidants, and their reaction mechanisms. *RSC Adv.*, 5: 27986-28006.
- Ningrat, A. W. S. 2022. Docking molekuler senyawa brazilein herba *Caesalpinia sappanis* Lignum pada mycobacterium *Tuberculosis inha* sebagai antituberkulosis. *INHEALTH: Indonesian Health Journal*, 1(1): 29-34.
- Nuringtyas, T. R., R. Isomarina, Y. Septia, L. Hidayati, N. Wijayanti, S. Moeljopawiro. 2018. The antioxidant and cytotoxic activities of the

- chloroform extract of agarwood (*Gyrinops versteegii* (Gilg.) Domke) leaves on HeLa cell lines. *AIP Conf. Proc.*, 2002, 020067.
- Ouyang, J. K., Dong, L. M., Xu, Q. L., Wang, J., Liu, S. B., Qian, T., Yuan, Y. F., & Tan, J. W. (2018). Triterpenoids with α -glucosidase inhibitory activity and cytotoxic activity from the leaves of *Akebia trifoliata*. *RSC advances*, 8(70), 40483–40489.
- Pan, Y., L. Li, S. Xiao, Z. Chen, S. Sarsaiya, S. Zhang, Y. ShangGuan, H. Liu, & D. Xu. 2020. Callus growth kinetics and accumulation of secondary metabolites of *Bletilla striata* Rchb.f. using a callus suspension culture. *PLoS one*, 15(2): e0220084.
- Panigrahy, S. K., R. Bhatt, & A. Kumar. 2020. Targeting type II diabetes with plant terpenes: the new and promising antidiabetic therapeutics. *Biolgia*, 76(1): 1-14.
- Pantsar, T., & A. Poso. 2018. *Binding affinity* via Docking: Fact and Fiction. *Molecules*, 23(8): 1899.
- Parasuraman, S. 2011. Prediction of activity spectra for substances. *J Pharmacol Pharmacother*, 2(1): 52–53.
- Park, S. W., B. H. Lee, S. H. Song, & M. K. Kim. 2023. Validating the use of database potentials in protein structure determination by NMR. *Journal of Structural Biology*, 25(1): 107939.
- Patil, P., S. Mandal, S. K. Tomar & S. Anand. Food protein-derived bioactive peptides in management of type 2 diabetes. *Eur J Nutr.*, 54: 1-18.
- Pattanaik, B., & P. Lindberg. 2015. Terpenoids and their biosynthesis in cyanobacteria. *Life (Basel)*, 5(1):269-293.
- Paul, A. 2019. *Drug Absorption and Bioavailability*. In G. M. Raj & R. Raveendran (Eds.), *Introduction to Basics of Pharmacology and Toxicology*. Springer Singapore: Singapore.
- Patel, H. and R. Krishnamurthy. 2013. Elisitors in Plant Tissue Culture. *J Pharmacogn Phytochem*, 2(2): 60-65.
- Payne, G. F., N. N. Payne, & M. L. Shuler. 1987. Bioreactor considerations for secondary metabolite production from plant cell tissue culture: Indole alkaloids from *Catharanthus roseus*. *Biotechnology and Bioengineering*, 31: 905-912.
- Pradani, T. C., Fatimawali, A. E. Manampiring, B. J. Kepel, F. D. Budiarto, & W. Bodhi. 2021. Molecular docking terhadap senyawa kurkumin dan arturmeron pada tumbuhan kunyit (*Curcuma longa* Linn.) yang berpotensi menghambat virus corona. *eBiomedik*, 9(2): 208-214.
- Price, G. and D.A. Patel. 2023. *Drug Bioavailability*. StatPearls Publishing.
- Pyun, D. H., T. J. Kim, S. Y. Park, H. J. Lee, A. M. A. El-Aty, J. H. Jeong, & T. W. Jung. 2021. Patchouli alcohol ameliorates skeletal muscle insulin resistance and NAFLD via AMPK/SIRT1-mediated suppression of inflammation. *Molecular and Cellular Endocrinology*, 538: 111464.
- Quezada-Calvillo, R., L. Sim, Z. Ao, B. R Hamaker, A. Quaroni, G. D. Brayer, E. E. Sterchi, C. C. Robayo-Torres, D. R. Rose, & B. L. Nichols. 2008. Luminal starch substrate “brake” on maltase-glucoamylase activity is located within the glucoamylase subunit. *J Nutr*, 138: 685–692.
- Rajesh, K.D., V. Subramanian, A. Panneerselvam, N. V. Rajesh, & N. Jeyathilakan. 2016. GC-MS Analysis of Secondary Metabolites from The Whole Plant

- Methanolic Extract of *Drynaria quercifolia* (L) J. Smith. *Journal of Advanced Applied Scientific Research*: 84-89.
- Ribeiro, I. G., C. R. M. Gayer, C. C. Tatiana, & M. G. P. Coelho. 2015. Compact callus cultures and evaluation of the antioxidant activity of *Hovenia dulcis* Thunb. (Rhamnaceae) under in vivo and in vitro culture conditions. *Journal of Medicinal Plants Research*, 9(1):8-15.
- Rockwood, A. L., M. M. Kushnir, & N. J. Clarke. 2018. *2-Mass Spectrometry*. In N. Rifai, A. R. Horvath, & C. T. Wittwer (Eds.), *Principles and Applications of Clinical Mass Spectrometry: Small Molecules, Peptides, and Pathogens*. Elsevier: Netherlands.
- Santos, M. R. A., C. A. de Souza, & E. S. Paz. 2017. Growth pattern of friable calluses from leaves of *Capsicum annuum* var. *annuum* cv. Iberaba Jalapeño. *Revista Ciência Agronômica*, 48(3): 523-530.
- Schrey A.K., Nickel-Seeber J., Drwal M.N., Zwicker P., Schultze N., Haertel B., Preissner R. 2017. Computational prediction of immune cell cytotoxicity. *Food Chem. Toxicol*, 107:150–166.
- Semwal, R., R. B. Semwal, J. Lehman, & D. K. Semwal. 2022. Recent advances in immunotoxicity and its impact on human health: causative agents, effects, and existing treatments. *International Immunopharmacology*, 108: 108859.
- Setiyoko, B. 1995. *Kultur Meristem Tanaman Pisang (Musa paradisiaca L.) Kultivar Ambon untuk Memperoleh Tanaman yang Bebas Cucur Mosaic Virus*. Skripsi. Yogyakarta: Fakultas Biologi Universitas Gadjah Mada.
- Shakya, P., G. Marslin, K. Siram, L. Beerhues, & G. Franklin. 2019. Elicitation as a tool to improve the profiles of high-value secondary metabolites and pharmacological properties of *Hypericum perforatum*. *J Pharm Pharmacol*, 71(1): 70-82.
- Shivanand, P., N. F. Arbie, S. Krishnamoorthy, & N. Ahmad. 2022. Agarwood-The fragrant molecules of wounded tree. *Molecules*, 27(11): 3386.
- Sim, L., C. Willemsma, S. Mohan, H. Y. Naim, B. M. Pinto, & D. R. Rose. 2010. Structural Basis for Substrate Selectivity in Human Maltase-Glucoamylase and Sucrase-Isomaltase N-terminal Domains. *J Biol Chem.*, 285(23): 17763–17770.
- Singh, S., Q. B. Baker, & D. B. Singh. 2022. Molecular docking and molecular dynamics simulation. In: Singh, D. B. & R. K. Pathak (Eds.), *Bioinformatics*. Academic Press: London.
- Subowo, Y. B. 2010. Jamur pembentuk gaharu sebagai penjaga kelangsungan hidup tanaman gaharu (*Aquilaria* sp). *J. Tek. Ling.*, 11(2): 167-173.
- Sukito, A., S. Darmawan, & A. I. Prihantini. 2020. Screening of antioxidant and antidiabetic activity from fruit bark, stem bark and leaves of *Gyrinops versteegii* (Gilg.) Domke. *IOP Conf. Series: Materials Science and Engineering*, 935: 012004.
- Sumarna, Y. 2002. *Budi Daya Gaharu*. Swadaya: Jakarta.
- Sutomo, S., R. Iryadi, & I. M. Sumerta. 2021. Conservation Status of Agarwood-Producing Species (*Gyrinops versteegii*) in Indonesia. *Biosaintifika Journal of Biology & Biology Education*, 13(2): 149-157.
- Tan, C. S., Isa, N. M., Ismail, I., and Zainal, Z. 2019. Agarwood Induction: Current Developments and Future Perspectives. *Frontiers in Plant Science* 10:122.

- Tan, X. C., K. H. Chua, M. Ravishankar, & U. R. Kuppusamy. 2016. Monoterpenes: Novel insights into their biological effects and roles on glucose uptake and lipid metabolism in 3T3-L1 adipocytes. *Food Chemistry*, 196: 242-250.
- Tang, S., R. Chen, M. Lin, Q. Lin, Y. Zhu, J. Ding, H. Hu, M. Ling, dan J. Wu. 2022. Accelerating AutoDock Vina with GPUs. *Molecules*, 27(9): 3041.
- Tajuddin, S. N., & M. M. Yusoff. 2010. Chemical composition of volatile oils of *Aquilaria malaccensis* (Thymelaeaceae) from Malaysia. *Natural Product Communications*, 5 (12): 1965-1968.
- Tounekti, T., I. Hernández, & S. Munné-Bosch. 2013. Salicylic acid biosynthesis and role in modulating terpenoid and flavonoid metabolism in plant response to abiotic stress. In S. Hayat, A. Ahmad, & M. N. Alyemeni (Eds.), *Salicylic acid plant growth and development* (pp. 141-162). Springer: New York.
- Trikkalinou, A., A. K. Papazafiropoulou & A. Melidonis. 2017. Type 2 diabetes and quality of life. *World Journal of Diabetes*, 8(4): 120-129.
- Wahyuni, R., A. I. Prihantini, & L. Anggadhanika. 2020. Formation of *Gyrinops versteegii* Agarwood by *Fusarium solani* Bioinduction with Simpori Technique. *Jurnal Ilmu Pertanian Indonesia*, 25(1): 152–159.
- Wahyuni, A., B. Satria, & A. Zainal. 2020. Induksi Kalus Gaharu dengan NAA dan BAP Secara In Vitro. *Agrosains Jurnal Penelitian Agronomi*, 22(1): 39–44.
- Walker, J. M. 2002. *The Protein Protocols Handbook*. Humana Totowa: United States.
- Wangiyana, I. G. A. S., & E. Iskandar. 2021. Bio-induksi ranting cabang gaharu (*Gyrinops versteegii*) di perkebunan gaharu Desa Pejaring Lombok Timur, J. *Hut. Trop.*, 5 (2): 106-115.
- Wangiyana, I. G. A. S., & D. S. Putri. 2019. Aplikasi zat pengatur tumbuh dan kegiatan pruning dalam optimalisasi budidaya gaharu di Desa Duman Kecamatan Lingsar Lombok Barat. *Lumbung Inovasi*, 4(1): 1–7.
- Wangiyana, I. G. A. S., Supriadi, A. Nikmatullah, Sunarpi, D. S. Putri, & S. Rosidah. 2021. Phytochemical screening and antioxidant activity of *Gyrinops* tea from agarwood plantation on Lombok island, Indonesia. *IOP Conf. Ser.: Earth Environ. Sci.* 712 012029.
- Wardana, T. A. P. 2019. *Identifikasi Senyawa Aktif Anti Kanker Ekstrak dan Fraksi Daun Gaharu (Gyrinops versteegii (Gilg.) Domke) dengan LC-MS dan GC-MS*. [Skripsi, Universitas Gadjah Mada].
- Wardana, T. A. P., T. R. Nuringtyas, N. Wijayanti, & L. Hidayati. 2019. Phytochemical analysis of agarwood (*Gyrinops versteegii* (Gilg.) Domke) leaves extracts as anticancer using GC-MS. *AIP Conf. Proc.* 2194, 020136.
- Wati, T., I. A. Astarini, M. Pharmawati, & E. Hendriyani. 2020. Perbanyakan *Begonia bimaensis* Undaharta & Ardaka Dengan Teknik Kultur Jaringan. *Metamorfosa: Journal of Biological Sciences* 7(1): 112-122.
- Widyawati, T., N. A. Yusoff, M. Z. Asmawi, & M. Ahmad. 2015. Antihyperglycemic effect of methanol extract of *Syzygium polyanthum* (Wight.) leaf in streptozotocin-induced diabetic rats. *Nutrients*, 7(9): 7764-7780.

- Widyawati, T., R. A. Syaputra, S. Syarifah, & I. B. Sumantri. 2023. Analysis of antidiabetic activity of *Squalene* via *in silico* and *in vivo* assay. *Molecules*, 28(9): 3783.
- Wilcox, G. 2005. Insulin and insulin resistance. *Clin Biochem Rev.*, 26: 19-39.
- Wresdiyati, T., S. Sa'diah, A. Winarto, & V. Febriyani. 2015. A-glucosidase inhibition and hypoglycemic activities of *Swietenia mahagoni* seed extract. *HAYATI Journal of Biosciences*, 22(2): 73-78.
- Xiong, G., Z. Wu, J. Yi, L. Fu, Z. Yang, C. Hsieh, M. Yin, X. Zeng, C. Wu, A. Lu, X. Chen, T. Hou, & D. Cao. 2021. ADMETlab 2.0: an integrated online platform for accurate and comprehensive predictions of ADMET properties. *Nucleic Acids Res.*, 49(1):5-14.
- Yang, D., X. Du, X. Liang, R. Han, Z. Liang, Y. Liu, F. Liu, & J. Zhao. 2012. Different roles of the mevalonate and methylerythritol phosphate pathways in cell growth and tanshinone production of *Salvia miltiorrhiza* hairy roots. *PLoS ONE*, 7(11): e46797.
- Yu, Z., W. Dong, Y. Wang, W. Li, Z. Guo, W. Mei, & H. Dai. 2023. Identification of aroma-active components from cultivated agarwood 'Qi-Nan' based on GC-O-MS combined with aroma extract dilution analysis. *Flavour and Fragrance Journal*, 38(5): 392-403
- Yulistyarini T, Fiqa AP, Budiharta S, Rindyastuti R. 2020. Distribution of *Gyrinops versteegii* in varying vegetation structures, soil properties, and microclimates in western part of Flores Island, Indonesia. *Biodiversitas*, 21(5): 1800-1808.
- Zaheer, M. & C. C. Giri. 2017. Enhanced diterpene lactone (andrographolide) production from elicited adventitious root cultures of *Andrographis paniculata*. *Research on Chemical Intermediates*, 43: 2433–2444.
- Zhang L., C. M. Mchale, N. Greene, R. D. Snyder, I. N. Rich, M. J. Aardema, S. Roy, & S. Pfuhler. 2014. Commentary emerging approaches in predictive toxicology. *Environ Mol Mutagen.*, 55(9): 679–688.
- Zhang, G., Z. Ao, & B. R. Hamaker. 2009. *Controlling The Delivery of Glucose In Foods*. In D. J. McClements & E. A. Decker (Eds.), *Designing Functional Foods Measuring and Controlling Food Structure Breakdown and Nutrient Absorption*. Woodhead Publishing: Cambridge.
- Zhu, C., G. Miao, J. Guo, Y. Huo, X. Zhang, J. Xie, & J. Feng. 2014. Establishment of *Tripterygium wilfordii* Hook. f. Hairy root culture and optimization of its culture conditions for the production of triptolide and wilforine. *J Microbiol Biotechnol.*, 24(6): 823-834.