

DAFTAR PUSTAKA

- Af-idah, B. M., Hanafi, M., & Elya, B. (2021). Antioxidant and Alpha Glucosidase Inhibitor Screening of *Merremia peltata L.* as Potential Traditional Treatment for Diabetes Mellitus. *Pharmacognosy Journal*, 13(4), 902–908. <https://doi.org/10.5530/pj.2021.13.116>
- Agu, P. C., Afiukwa, C. A., Orji, O. U., Ezeh, E. M., Ofoke, I. H., Ogbu, C. O., ... Aja, P. M. (2023). Molecular docking as a tool for the discovery of molecular targets of nutraceuticals in diseases management. *Scientific Reports*, 13(1). <https://doi.org/10.1038/s41598-023-40160-2>
- Ahmad, I., Kuznetsov, A. E., Abdul Saboor Pirzada, Alsharif, K. F., Daghia, M., & Khan, H. (2023). Computational pharmacology and computational chemistry of 4-hydroxyisoleucine: Physicochemical, pharmacokinetic, and DFT-based approaches. *Frontiers in Chemistry*, 11. <https://doi.org/10.3389/fchem.2023.1145974>
- Ajebli, M., & Eddouks, M. (2019). The Promising Role of Plant Tannins as Bioactive Antidiabetic Agents. *Current Medicinal Chemistry*, 26(25), 4852–4884. <https://doi.org/10.2174/0929867325666180605124256>
- Al-Ishaq, R. K., Abotaleb, M., Kubatka, P., Kajo, K., & Büsselberg, D. (2019). Flavonoids and Their Anti-Diabetic Effects: Cellular Mechanisms and Effects to Improve Blood Sugar Levels. *Biomolecules*, 9(9). <https://doi.org/10.3390/biom9090430>

- Al-Sayed, E., Michel, H. E., Khattab, M. A., El-Shazly, M., & Singab, A. N. (2019). Protective Role of Casuarinin from *Melaleuca leucadendra* against Ethanol-Induced Gastric Ulcer in Rats. *Planta Medica*, 86(01), 32–44. <https://doi.org/10.1055/a-1031-7328>
- Aleixandre, A., Gil, J. V., Sineiro, J., & Rosell, C. M. (2022). Understanding phenolic acids inhibition of α -amylase and α -glucosidase and influence of reaction conditions. *Food Chemistry*, 372, 131231. <https://doi.org/10.1016/j.foodchem.2021.131231>
- Alkandahri, M. Y., Sujana, D., Hasyim, D. M., Shafirany, M. Z., Sulastri, L., Arfania, M., ... Yuniarshih, N. (2021). Antidiabetic Activity of Extract and Fractions of *Castanopsis costata* Leaves on Alloxan-induced Diabetic Mice. *Pharmacognosy Journal*, 13(6s), 1589–1593. <https://doi.org/10.5530/pj.2021.13.204>
- Alqahtani, A. S., Hidayathulla, S., Rehman, M. T., ElGamal, A. A., Al-Massarani, S., Razmovski-Naumovski, V., ... AlAjmi, M. F. (2019). Alpha-Amylase and Alpha-Glucosidase Enzyme Inhibition and Antioxidant Potential of 3-Oxolupenal and Katononic Acid Isolated from *Nuxia oppositifolia*. *Biomolecules*, 10(1), 61. <https://doi.org/10.3390/biom10010061>
- American Diabetes Association. (2022). *Classification and diagnosis of diabetes: Standards of Medical Care in Diabetes - 2020* *Diabetes Care*. 43(1), S14–S31.
- Ashafa, A. T., & Nafiu, M. (2017). Antioxidant and inhibitory effects of saponin extracts from *Dianthus basuticus* Burtt Davy on key enzymes implicated in

- type 2 diabetes In vitro. *Pharmacognosy Magazine*, 13(52), 576.
https://doi.org/10.4103/pm.pm_583_16
- Assefa, S. T., Yang, E.-Y., Chae, S.-Y., Song, M., Lee, J., Cho, M.-C., & Jang, S. (2019). Alpha Glucosidase Inhibitory Activities of Plants with Focus on Common Vegetables. *Plants*, 9(1), 2.
<https://doi.org/10.3390/plants9010002>
- Attaallah, R., & Amine, A. (2021). The Kinetic and Analytical Aspects of Enzyme Competitive Inhibition: Sensing of Tyrosinase Inhibitors. *Biosensors*, 11(9), 322. <https://doi.org/10.3390/bios11090322>
- Barrea, L., Vetrani, C., Verde, L., Frias-Toral, E., Ceriani, F., Cernea, S., ... Muscogiuri, G. (2023). Comprehensive Approach to Medical Nutrition Therapy in Patients with Type 2 Diabetes Mellitus: From Diet to Bioactive Compounds. *Antioxidants*, 12(4), 904–904.
<https://doi.org/10.3390/antiox12040904>
- Barstow, M. (2018). IUCN Red List of Threatened Species: *Castanopsis tungurru*. Retrieved October 9, 2023, from IUCN Red List of Threatened Species website: <https://doi.org/10.2174/1573399812666160613111959>.
- Behbahani, M., Moradi, M., & Mohabatkar, H. (2021). In silico design of a multi-epitope peptide construct as a potential vaccine candidate for Influenza A based on neuraminidase protein. *In Silico Pharmacology*, 9(1).
<https://doi.org/10.1007/s40203-021-00095-w>
- Bhatia, A., Singh, B., Arora, R., & Arora, S. (2019). In vitro evaluation of the α -glucosidase inhibitory potential of methanolic extracts of traditionally used

- antidiabetic plants. *BMC Complementary and Alternative Medicine*, 19(1).
<https://doi.org/10.1186/s12906-019-2482-z>
- Bitew, M., Desalegn, T., Demissie, T. B., Belayneh, A., Endale, M., & Eswaramoorthy, R. (2021). Pharmacokinetics and drug-likeness of antidiabetic flavonoids: Molecular docking and DFT study. *PLOS ONE*, 16(12), e0260853. <https://doi.org/10.1371/journal.pone.0260853>
- Boulton, S., Selvaratnam, R., Blondeau, J.-P., Lezoualc'h, F., & Melacini, G. (2018). Mechanism of Selective Enzyme Inhibition through Uncompetitive Regulation of an Allosteric Agonist. *Journal of the American Chemical Society*, 140(30), 9624–9637. <https://doi.org/10.1021/jacs.8b05044>
- Brogi, S., Ramalho, T. C., Kuca, K., Medina-Franco, J. L., & Valko, M. (2020). Editorial: In silico Methods for Drug Design and Discovery. *Frontiers in Chemistry*, 8. <https://doi.org/10.3389/fchem.2020.00612>
- Bunally, S. B., Luscombe, C. N., & Young, R. J. (2019). Using Physicochemical Measurements to Influence Better Compound Design. *SLAS Discovery: Advancing Life Sciences R & D*, 24(8), 791–801.
<https://doi.org/10.1177/2472555219859845>
- Cahyaningsih, R., Magos Brehm, J., & Maxted, N. (2021). Setting the priority medicinal plants for conservation in Indonesia. *Genetic Resources and Crop Evolution*, 68(5), 2019–2050. <https://doi.org/10.1007/s10722-021-01115-6>
- Carvalho, C., Varela, S. A. M., Marques, T. A., Knight, A., & Vicente, L. (2020). Are in vitro and in silico approaches used appropriately for animal-based

- major depressive disorder research? *PLOS ONE*, 15(6), e0233954.
<https://doi.org/10.1371/journal.pone.0233954>
- Cele, N., Awolade, P., Seboletswe, P., Olofinsan, K., Islam, Md. S., & Singh, P. (2022). α -Glucosidase and α -Amylase Inhibitory Potentials of Quinoline–1,3,4-oxadiazole Conjugates Bearing 1,2,3-Triazole with Antioxidant Activity, Kinetic Studies, and Computational Validation. *Pharmaceuticals*, 15(8), 1035. <https://doi.org/10.3390/ph15081035>
- Che, X., Liu, Q., & Zhang, L. (2023). An accurate and universal protein-small molecule batch docking solution using Autodock Vina. *Results in Engineering*, 19, 101335. <https://doi.org/10.1016/j.rineng.2023.101335>
- Chelladurai, G. R. M., & Chinnachamy, C. (2018). Alpha amylase and Alpha glucosidase inhibitory effects of aqueous stem extract of *Salacia oblonga* and its GC-MS analysis. *Brazilian Journal of Pharmaceutical Sciences*, 54(1). <https://doi.org/10.1590/s2175-97902018000117151>
- Choudary, A. (2022). Enzyme Kinetics (Michaelis-Menten plot, Line-Weaver Burke plot) Enzyme Inhibitors with Examples: Pharmaceutical Guidelines. Retrieved from www.pharmaguideline.com website:
<https://www.pharmaguideline.com>
- Correia, C., Ferreira, A., Santos, J., Lapa, R., Yliperttula, M., Urtti, A., & Vale, N. (2021). New In Vitro-In Silico Approach for the Prediction of In Vivo Performance of Drug Combinations. *Molecules*, 26(14), 4257.
<https://doi.org/10.3390/molecules26144257>

- Dandekar, P. D., Kotmale, A. S., Chavan, S. R., Kadlag, P. P., Sawant, S. V., Dhavale, D. D., & RaviKumar, A. (2021). Insights into the Inhibition Mechanism of Human Pancreatic α -Amylase, a Type 2 Diabetes Target, by Dehydrodieugenol B Isolated from *Ocimum tenuiflorum*. *ACS Omega*, 6(3), 1780–1786. <https://doi.org/10.1021/acsomega.0c00617>
- Daou, M., Elnaker, N. A., Ochsenkühn, M. A., Amin, S. A., Yousef, A. F., & Yousef, L. F. (2022). In vitro α -glucosidase inhibitory activity of *Tamarix nilotica* shoot extracts and fractions. *PLOS ONE*, 17(3), e0264969. <https://doi.org/10.1371/journal.pone.0264969>
- Dehelean, C. A., Lazureanu, V., Coricovac, D., Mioc, M., Oancea, R., Marcovici, I., ... Cretu, O. (2020). SARS-CoV-2: Repurposed Drugs and Novel Therapeutic Approaches—Insights into Chemical Structure—Biological Activity and Toxicological Screening. *Journal of Clinical Medicine*, 9(7), 2084. <https://doi.org/10.3390/jcm9072084>
- DiNicolantonio, J. J., Bhutani, J., & O'Keefe, J. H. (2015). Acarbose: safe and effective for lowering postprandial hyperglycaemia and improving cardiovascular outcomes. *Open Heart*, 2(1), e000327. <https://doi.org/10.1136/openhrt-2015-000327>
- Dirir, A. M., Daou, M., Yousef, A. F., & Yousef, L. F. (2021). A review of alpha-glucosidase inhibitors from plants as potential candidates for the treatment of type-2 diabetes. *Phytochemistry Reviews*. <https://doi.org/10.1007/s11101-021-09773-1>

- Domínguez-Villa, F. X., Durán-Iturbide, N. A., & Ávila-Zárraga, J. G. (2021). Synthesis, molecular docking, and in silico ADME/Tox profiling studies of new 1-aryl-5-(3-azidopropyl) indol-4-ones: Potential inhibitors of SARS CoV-2 main protease. *Bioorganic Chemistry*, 106, 104497. <https://doi.org/10.1016/j.bioorg.2020.104497>
- Eka, L., Wahyuni, T., Hardinsyah, H., & Setiawan, B. (2020). In-Vitro Alpha Amylase Inhibition and Antioxidant Activities of Leaves Extract of Sundanese Traditional Salad (Lalapan) from Indonesia. *J. Gizi Pangan*, 15(2), 109–118. <https://doi.org/10.25182/jgp.15.2.109-118>
- Ernawati, U., Wihastuti, T. A., & Utami, Y. W. (2021). Effectiveness of diabetes self-management education (DSME) in type 2 diabetes mellitus (T2DM) patients: Systematic literature review. *Journal of Public Health Research*, 10(2), 198–202. <https://doi.org/10.4081/jphr.2021.2240>
- Etsassala, N. G. E. R., Badmus, J. A., Marnewick, J. L., Iwuoha, E. I., Nchu, F., & Hussein, A. A. (2020). Alpha-Glucosidase and Alpha-Amylase Inhibitory Activities, Molecular Docking, and Antioxidant Capacities of *Salvia aurita* Constituents. *Antioxidants*, 9(11), 1149. <https://doi.org/10.3390/antiox9111149>
- Fadimu, G. J., Farahnaky, A., Gill, H., Olalere, O. A., Gan, C.-Y., & Truong, T. (2022). In-Silico Analysis and Antidiabetic Effect of α -Amylase and α -Glucosidase Inhibitory Peptides from Lupin Protein Hydrolysate: Enzyme-Peptide Interaction Study Using Molecular Docking Approach. *Foods*, 11(21), 3375. <https://doi.org/10.3390/foods11213375>

- Forst, T., Heise, T., & Plum-Morschel, L. (2016). Pharmacological Intervention in Type 2 Diabetes Mellitus - A Pathophysiologically Reasoned Approach? *Current Diabetes Reviews*, 12(4), 429–439.
<https://doi.org/10.2174/1573399812666160613111959>
- Galicia-Garcia, U., Benito-Vicente, A., Jebari, S., Larrea-Sebal, A., Siddiqi, H., Uribe, K. B., ... Martín, C. (2020). Pathophysiology of type 2 diabetes mellitus. *International Journal of Molecular Sciences*, 21(17), 1–34.
<https://doi.org/10.3390/ijms21176275>
- Geisslitz, S., Weegels, P., Shewry, P., Zevallos, V., Masci, S., Sorrells, M., ... Brouns, F. (2022). Wheat amylase/trypsin inhibitors (ATIs): occurrence, function and health aspects. *European Journal of Nutrition*, 61(6), 2873–2880. <https://doi.org/10.1007/s00394-022-02841-y>
- Gong, L., Feng, D., Wang, T., Ren, Y., Liu, Y., & Wang, J. (2020). Inhibitors of α -amylase and α -glucosidase: Potential linkage for whole cereal foods on prevention of hyperglycemia. *Food Science & Nutrition*, 8(12), 6320–6337.
<https://doi.org/10.1002/fsn3.1987>
- Guzmán, G. G., Garza, B. A., Ríos, R. C., Minsky, N. W., & Aranda, R. S. (2022). Assessment Of α -Amylase Inhibition Activity by An Optimized And Validated In Vitro Microscale Method. *Química Nova*.
<https://doi.org/10.21577/0100-4042.20170919>
- Haghghi, O. (2021). In Silico Study of the Structure and Ligand Preference of Pyruvate Kinases from Cyanobacterium Synechocystis sp. PCC 6803.

- Applied Biochemistry and Biotechnology*, 193(11), 3651–3671.
<https://doi.org/10.1007/s12010-021-03630-9>
- Hart, P. A., Bellin, M. D., Andersen, D. K., Bradley, D., Cruz-Monserrate, Z., Forsmark, C. E., ... Chari, S. T. (2016). Type 3c (pancreatogenic) diabetes mellitus secondary to chronic pancreatitis and pancreatic cancer. *The Lancet Gastroenterology & Hepatology*, 1(3), 226–237.
[https://doi.org/10.1016/s2468-1253\(16\)30106-6](https://doi.org/10.1016/s2468-1253(16)30106-6)
- Hedrington, M. S., & Davis, S. N. (2019). Considerations When Using Alpha-glucosidase Inhibitors in the Treatment of Type 2 Diabetes. *Expert Opinion on Pharmacotherapy*, 20(18), 2229–2235.
<https://doi.org/10.1080/14656566.2019.1672660>
- Hirsch, C., & Schildknecht, S. (2019). In Vitro Research Reproducibility: Keeping Up High Standards. *Frontiers in Pharmacology*, 10.
<https://doi.org/10.3389/fphar.2019.01484>
- Hurle, S., & Hsu, W. H. (2017). The etiology of oxidative stress in insulin resistance. *Biomedical Journal*, 40(5), 257–262.
<https://doi.org/10.1016/j.bj.2017.06.007>
- Ibrahim, M. A., Koорбанally, N. A., & Islam, Md. S. (2014). Antioxidative Activity and Inhibition of Key Enzymes Linked to Type-2 Diabetes (α -Glucosidase and α -Amylase) by Khaya Senegalensis. *Acta Pharmaceutica*, 64(3), 311–324. <https://doi.org/10.2478/acph-2014-0025>
- International Diabetic Federation. (2021). *International Diabetic Federation Diabetes Atlas 10th Edition*.

- Isabellasandra, R. (2023). *Uji Aktivitas Antioksidan Ekstrak Batang Ki Tungereut (Castanopsis tungurru (Blume) A.DC.) Menggunakan Metode DPPH (1,1-Diphenyl-2-picrylhydrazl) dan FRAP (Ferric Reducing Antioxidant Power)*. Universitas Pelita Harapan. Retrieved from repository.uph.edu.
- Ismail, T., Calcabrini, C., Diaz, A., Fimognari, C., Turrini, E., Catanzaro, E., ... Sestili, P. (2016). Ellagitannins in Cancer Chemoprevention and Therapy. *Toxins*, 8(5), 151. <https://doi.org/10.3390/toxins8050151>
- Jaghoori, M. M., Bleijlevens, B., & Olabarriaga, S. D. (2016). 1001 Ways to run AutoDock Vina for virtual screening. *Journal of Computer-Aided Molecular Design*, 30(3), 237–249. <https://doi.org/10.1007/s10822-016-9900-9>
- Jenis, J., Aizhamal Baiseitova, Sang Hwa Yoon, Park, C., Jeong Yoon Kim, Zuo Peng Li, Ki Hun Park. (2019). Competitive α -glucosidase inhibitors, dihydrobenzoxanthones, from the barks of *Artocarpus elasticus*. *Journal of Enzyme Inhibition and Medicinal Chemistry*, 34(1), 1623–1632. <https://doi.org/10.1080/14756366.2019.1660653>
- Kahanovitz, L., Sluss, P. M., & Russell, S. J. (2017). Type 1 Diabetes—A Clinical Perspective. *Point of Care: The Journal of Near-Patient Testing & Technology*, 16(1), 37–40. <https://doi.org/10.1097/poc.0000000000000125>
- Kan, L., Capuano, E., Fogliano, V., Verkerk, R., Mes, J. J., Tomassen, M. M. M., & Oliviero, T. (2021). Inhibition of α -glucosidases by tea polyphenols in rat intestinal extract and Caco-2 cells grown on Transwell. *Food Chemistry*, 361, 130047. <https://doi.org/10.1016/j.foodchem.2021.130047>

- Kementerian Kesehatan Republik Indonesia . (2020). Tetap Produktif, Cegah, dan Atasi Diabetes Melitus. *Pusat Data Dan Informasi Kementerian Kesehatan*
- Khan, B. A., Hamdani, S. S., Khalid, M., Ashfaq, M., Munawar, K. S., Tahir, M. N., Sidhom, P. A. (2023). Exploring Probenecid Derived 1,3,4-Oxadiazole-Phthalimide Hybrid as α -Amylase Inhibitor: Synthesis, Structural Investigation, and Molecular Modeling. *Pharmaceuticals*, 16(3), 424–424.
<https://doi.org/10.3390/ph16030424>
- Kirwan, J. P., Sacks, J., & Nieuwoudt, S. (2018). The essential role of exercise in the management of type 2 diabetes. *Cleveland Clinic Journal of Medicine*, 84(7), 15–21. <https://doi.org/10.3949/ccjm.84.s1.03>
- Krishnan, A., Alias, Z., Convey, P., González-Aravena, M., Smykla, J., Rizman-Idid, M., & Alias, S. A. (2022). Temperature and pH Profiling of Extracellular Amylase from Antarctic and Arctic Soil Microfungi. *Fermentation*, 8(11), 601. <https://doi.org/10.3390/fermentation8110601>
- Lankatillake, C., Luo, S., Flavel, M., Lenon, G. B., Gill, H., Huynh, T., & Dias, D. A. (2021). Screening natural product extracts for potential enzyme inhibitors: protocols, and the standardisation of the usage of blanks in α -amylase, α -glucosidase, and lipase assays. *Plant Methods*, 17(1).
<https://doi.org/10.1186/s13007-020-00702-5>
- Lehoczki, G., Kandra, L., & Gyémánt, G. (2018). The use of starch azure for measurement of alpha-amylase activity. *Carbohydrate Polymers*, 183, 263–266. <https://doi.org/10.1016/j.carbpol.2017.12.037>

- Li, Y., Zhang, X., Wang, R., Han, L., Huang, W., Shi, H., ... Zou, S. (2020). Altering the inhibitory kinetics and molecular conformation of maltase by Tangzhiqing (TZQ), a natural α -glucosidase inhibitor. *BMC Complementary Medicine and Therapies*, 20(1). <https://doi.org/10.1186/s12906-020-03156-3>
- Ma, R. C. (2014). Acarbose: an alternative to metformin for first-line treatment in type 2 diabetes? *The Lancet Diabetes & Endocrinology*, 2(1), 6–7. [https://doi.org/10.1016/s2213-8587\(13\)70107-4](https://doi.org/10.1016/s2213-8587(13)70107-4)
- Mao, X.-M., He, K., & Shi, J.-C. (2014). Safety and Efficacy of Acarbose in the Treatment of Diabetes in Chinese Patients. *Therapeutics and Clinical Risk Management*, 505. <https://doi.org/10.2147/tcrm.s50362>
- Marengo, M., Pezzilli, D., Gianquinto, E., Fissore, A., Oliaro-Bosso, S., Sgorbini, B., Adinolfi, S. (2022). Evaluation of Porcine and *Aspergillus oryzae* α -Amylases as Possible Model for the Human Enzyme. *Processes*, 10(4), 780. <https://doi.org/10.3390/pr10040780>
- Mattes, W. B. (2020). In vitro to in vivo translation. *Current Opinion in Toxicology*, 23-24, 114–118. <https://doi.org/10.1016/j.cotox.2020.09.001>
- Monagas, M., Brendler, T., Brinckmann, J., Dentali, S., Gafner, S., Giancaspro, G., Marles, R. (2022). Understanding plant to extract ratios in botanical extracts. *Frontiers in Pharmacology*, 13, 981978. <https://doi.org/10.3389/fphar.2022.981978>
- Movahedpour, A., Asadi, M., Khatami, S. H., Taheri-Anganeh, M., Adelipour, M., Shabaninejad, Z., Mousavi, P. (2021). A brief overview on the application

- and sources of α -amylase and expression hosts properties in order to production of recombinant α -amylase. *Biotechnology and Applied Biochemistry*. <https://doi.org/10.1002/bab.2140>
- Naglah, A. M., Askar, A. A., Hassan, A. S., Khatab, T. K., Al-Omar, M. A., & Bhat, M. A. (2020). Biological Evaluation and Molecular Docking with In Silico Physicochemical, Pharmacokinetic and Toxicity Prediction of Pyrazolo[1,5-a] pyrimidines. *Molecules*, 25(6), 1431. <https://doi.org/10.3390/molecules25061431>
- Narvaez, J. J. U., & Campos, M. R. S. (2022). Combination therapy of bioactive compounds with acarbose: A proposal to control hyperglycemia in type 2 diabetes. *Journal of Food Biochemistry*, 46(10). <https://doi.org/10.1111/jfbc.14268>
- Ogunyemi, O. M., Gyebi, G. A., Saheed, A., Paul, J., Nwaneri-Chidozie, V., Olorundare, O., Olaiya, C. O. (2022). Inhibition mechanism of alpha-amylase, a diabetes target, by a steroid pregnane and pregnane glycosides derived from *Gongronema latifolium* Benth. *Frontiers in Molecular Biosciences*, 9. <https://doi.org/10.3389/fmolb.2022.866719>
- Ononamadu, C., & Ibrahim, A. (2021). Molecular docking and prediction of ADME/drug-likeness properties of potentially active antidiabetic compounds isolated from aqueous-methanol extracts of *Gymnema sylvestre* and *Combretum micranthum*. *BioTechnologia*, 102(1), 85–99. <https://doi.org/10.5114/bta.2021.103765>

- Papatheodorou, K., Banach, M., Bekiari, E., Rizzo, M., & Edmonds, M. (2018). Complications of Diabetes 2017. *Journal of Diabetes Research*, 2018(3086167), 1–4. <https://doi.org/10.1155/2018/3086167>
- Parker, S., Lennon, D., Levy, J., Deog, K., Hong, C., Park, K.-M., ... Piazza, F. (2018). Introduction to Pharmaceutical Biotechnology. *IOP Science*. <https://doi.org/10.1088/978-0-7503-1302-5ch1>
- Pasin, T. M., Dos, E., Lucas, Benassi, V. M., Ziotti, L. S., Cereia, M., & Maria. (2019). Novel amylase-producing fungus hydrolyzing wheat and brewing residues, *Aspergillus carbonarius*, discovered in tropical forest remnant. *Folia Microbiologica*, 65(1), 173–184. <https://doi.org/10.1007/s12223-019-00720-4>
- Perkeni. (2021). *Pedoman Pengelolaan dan Pencegahan Diabetes Melitus Tipe 2 Di Indonesia* 2021.
- Pesaresi, A. (2023). Mixed and non-competitive enzyme inhibition: Underlying mechanisms and mechanistic irrelevance of the formal two-site model. *Journal of Enzyme Inhibition and Medicinal Chemistry*, 38(1). <https://doi.org/10.1080/14756366.2023.2245168>
- Pinzi, L., & Rastelli, G. (2019). Molecular Docking: Shifting Paradigms in Drug Discovery. *International Journal of Molecular Sciences*, 20(18), 4331. <https://doi.org/10.3390/ijms20184331>
- Plows, J., Stanley, J., Baker, P., Reynolds, C., & Vickers, M. (2018). The pathophysiology of gestational diabetes mellitus. *International Journal of Molecular Sciences*, 19(11). <https://doi.org/10.3390/ijms19113342>

- Pollini, L., Riccio, A., Juan, C., Tringaniello, C., Ianni, F., Blasi, F., ... Cossignani, L. (2020). Phenolic Acids from *Lycium barbarum* Leaves: In Vitro and In Silico Studies of the Inhibitory Activity against Porcine Pancreatic α -Amylase. *Processes*, 8(11), 1388. <https://doi.org/10.3390/pr8111388>
- Praparatana, R., Maliyam, P., Barrows, L. R., & Puttarak, P. (2022). Flavonoids and Phenols, the Potential Anti-Diabetic Compounds from *Bauhinia strychnifolia* Craib. Stem. *Molecules*, 27(8), 2393. <https://doi.org/10.3390/molecules27082393>
- Price, G. W., Gould, P. S., & Marsh, A. (2014). Use of Freely Available and Open-Source Tools for In Silico Screening in Chemical Biology. *Journal of Chemical Education*, 91(4), 602–604. <https://doi.org/10.1021/ed400302u>
- Proen  a, C., Freitas, M., Ribeiro, D., Tom  , S. M., Oliveira, E. F. T., Viegas, M. F., Fernandes, E. (2019). Evaluation of a flavonoids library for inhibition of pancreatic α -amylase towards a structure–activity relationship. *Journal of Enzyme Inhibition and Medicinal Chemistry*, 34(1), 577–588. <https://doi.org/10.1080/14756366.2018.1558221>
- Putri, D. M., & Suhendri, Y. (2020). Koleksi Tumbuhan Terancam Di Kebun Raya Cibodas Dari Hasil Eksplorasi Tahun 2015-2017 Di Bengkulu Dan Lampung (Sumatra). *OSF Preprints* (OSF Preprints). <https://doi.org/10.31219/osf.io/pw2ac>
- Quan, N., Xuan, T., Tran, H.-D., Thuy, N., Trang, L., Huong, C., Tuyen, P. (2019). Antioxidant, α -Amylase and α -Glucosidase Inhibitory Activities and

- Potential Constituents of *Canarium tramdenum* Bark. *Molecules*, 24(3), 605. <https://doi.org/10.3390/molecules24030605>
- Rahimi-Madiseh, M., Malekpour-Tehrani, A., Bahmani, M., & Rafieian-Kopaei, M. (2016). The research and development on the antioxidants in prevention of diabetic complications. *Asian Pacific Journal of Tropical Medicine*, 9(9), 825–831. <https://doi.org/10.1016/j.apjtm.2016.07.001>
- Rahman, M. S. (2021). Role of Insulin in Health and Disease: An Update. *International Journal of Molecular Sciences*, 22(12), 6403. <https://doi.org/10.3390/ijms22126403>
- Rehman, G., Hamayun, M., Iqbal, A., Ul Islam, S., Arshad, S., Zaman, K., Lee, I. (2018). In Vitro Antidiabetic Effects and Antioxidant Potential of *Cassia nemophila* Pods. *BioMed Research International*, 2018. <https://doi.org/10.1155/2018/1824790>
- Ren, F., Ji, N., & Yu, Z. (2023). Research Progress of α -Glucosidase Inhibitors Produced by Microorganisms and Their Applications. *Foods*, 12(18), 3344–3344. <https://doi.org/10.3390/foods12183344>
- Riany, H. (2019). Effects of Coffee Consumption In Improving Hyperglycemia In Diabetes-Induced Mice. *International Journal of Ecophysiology*, 1(1), 72–80. <https://doi.org/10.32734/ijoep.v1i1.850>
- Riyaphan, J., Pham, D.-C., Leong, M. K., & Weng, C.-F. (2021). In Silico Approaches to Identify Polyphenol Compounds as α -Glucosidase and α -Amylase Inhibitors against Type-II Diabetes. *Biomolecules*, 11(12), 1877. <https://doi.org/10.3390/biom11121877>

- Robinson, P. (2015). Enzymes: Principles and biotechnological applications. *Essays in Biochemistry*, 59(59), 1–41. <https://doi.org/10.1042/bse0590001>
- Rodriguez, J.-M. G., Hux, N. P., Philips, S. J., & Towns, M. H. (2019). Michaelis–Menten Graphs, Lineweaver–Burk Plots, and Reaction Schemes: Investigating Introductory Biochemistry Students’ Conceptions of Representations in Enzyme Kinetics. *Journal of Chemical Education*, 96(9), 1833–1845. <https://doi.org/10.1021/acs.jchemed.9b00396>
- Rosa, D., Elya, B., Hanafi, M., & Khatib, A. (2022). In vitro and molecular docking of α -Glucosidase inhibitor potency from *Artobotrys suaveolens* leaf and stem bark. *IOP Conference Series: Earth and Environmental Science*, 1116(1), 012007–012007. <https://doi.org/10.1088/1755-1315/1116/1/012007>
- Rosa, D., Elya, B., Hanafi, M., Khatib, A., Halim, Y., & Muhammad Imam Surya. (2023). Analysis of *Artobotrys hexapetalus* Stem Bark and Leaf Ethanol Extracts as α -Glucosidase Inhibitors: In Vitro Analysis, LC-MS/MS, Machine Learning, and Molecular Docking. *Revista Brasileira de Farmacognosia*. <https://doi.org/10.1007/s43450-023-00494-4>
- Rosa, D., Elya, B., Hanafi, M., Khatib, A., & Surya, M. I. (2022). In Vitro and In Silico Screening Analysis of *Artobotrys sumatranaus* Leaf and Twig Extracts for α -Glucosidase Inhibition Activity and Its Relationship with Antioxidant Activity. *Scientia Pharmaceutica*, 91(1), 2. <https://doi.org/10.3390/scipharm91010002>

- Sachan, A., Rao, C., & Sachan, N. (2019). In vitro studies on the inhibition of α -amylase and α -glucosidase by hydro-ethanolic extract of *Pluchea lanceolata*, *Alhagi pseudalhagi*, *Caesalpinia bonduc*. *Pharmacognosy Research*, 11(3), 310. https://doi.org/10.4103/pr.pr_31_19
- Sadeghi, M., Moradi, M., Madanchi, H., & Johari, B. (2021). In silico study of garlic (*Allium sativum L.*)-derived compounds molecular interactions with α -glucosidase. *In Silico Pharmacology*, 9(1). <https://doi.org/10.1007/s40203-020-00072-9>
- Sari, V. M., Manurung, T. F., & AM, I. (2022). Identifikasi Jenis Pohon Famili Dipterocarpaceae Di Kawasan Kebun Raya Sambas Kabupaten Sambas Kalimantan Barat. *Jurnal Hutan Lestari: Jurnal Penelitian Kehutanan*, 10(2), 370–370. <https://doi.org/10.26418/jhl.v10i2.53454>
- Sarian, M. N., Ahmed, Q. U., Mat So'ad, S. Z., Alhassan, A. M., Murugesu, S., Perumal, V., Latip, J. (2017). Antioxidant and Antidiabetic Effects of Flavonoids: A Structure-Activity Relationship Based Study. *BioMed Research International*, 2017, 1–14. <https://doi.org/10.1155/2017/8386065>
- Sarkar, D., Christopher, A., & Shetty, K. (2022). Phenolic Bioactives from Plant-Based Foods for Glycemic Control. *Frontiers in Endocrinology*, 12. <https://doi.org/10.3389/fendo.2021.727503>
- Shamsudin, N. F., Ahmed, Q. U., Mahmood, S., Shah, S. A. A., Sarian, M. N., Khattak, M. M. A. K., Latip, J. (2022). Flavonoids as Antidiabetic and Anti-Inflammatory Agents: A Review on Structural Activity Relationship-Based

- Studies and Meta-Analysis. *International Journal of Molecular Sciences*, 23(20), 12605. <https://doi.org/10.3390/ijms232012605>
- Silaban, S., Marika, D. B., & Simorangkir, M. (2020). Isolation and Characterization of Amylase-Producing Amylolytic Bacteria from Rice Soil Samples. *Journal of Physics: Conference Series*, 1485, 012006. <https://doi.org/10.1088/1742-6596/1485/1/012006>
- Suresh, V., Reddy, A., P. Muthukumar, & Thendarl Selvam. (2021). Antioxidants: Pharmacotherapeutic Boon for Diabetes. *InTechOpen EBooks*. <https://doi.org/10.5772/intechopen.98587>
- Sururi, A. M., Tukiran, T., Aisa, E. R., & Raihan, M. (2024). Identification of bioactive compounds and ADMET profile of stem bark of Syzygium samarangense and their potential as antibreast cancer and antiinflammatory. *Journal of Applied Pharmaceutical Science*. <https://doi.org/10.7324/japs.2024.143017>
- Tang Shidi, Chen, R., Lin, M., Lin, Q., Zhu, Y., Ding, J., ... Wu, J. (2022). Accelerating AutoDock Vina with GPUs. *Molecules*, 27(9), 3041–3041. <https://doi.org/10.3390/molecules27093041>
- Todkar, S. (2016). Diabetes Mellitus the Silent Killer of mankind: An overview on the eve of World Health Day! *Journal of Medical and Allied Sciences*, 6(1), 39. <https://doi.org/10.5455/jmas.214333>
- Tolmie, M., Bester, M. J., & Apostolides, Z. (2021). Inhibition of α -glucosidase and α -amylase by herbal compounds for the treatment of type 2 diabetes: A

- validation of in silico reverse docking with in vitro enzyme assays. *Journal of Diabetes*, 13(10), 779–791. <https://doi.org/10.1111/1753-0407.13163>
- Tomczak, J. M., & Węglarz-Tomczak, E. (2019). Estimating Kinetic Constants in the Michaelis–Menten Model from One Enzymatic Assay Using Approximate Bayesian Computation. *FEBS Letters*, 593(19), 2742–2750. <https://doi.org/10.1002/1873-3468.13531>
- Tušar, L., Novič, M., Tušar, M., & Zupan, J. (2018). Structural Elucidation . *Reference Module in Chemistry, Molecular Sciences and Chemical Engineering*. <https://doi.org/10.1016/b978-0-12-409547-2.10937-0>
- Vieira, T. F., & Sousa, S. F. (2019). Comparing AutoDock and Vina in Ligand/Decoy Discrimination for Virtual Screening. *Applied Sciences*, 9(21), 4538. <https://doi.org/10.3390/app9214538>
- Wickramaratne, M. N., Punchihewa, J. C., & Wickramaratne, D. B. M. (2016). In-vitro alpha amylase inhibitory activity of the leaf extracts of *Adenanthera pavonina*. *BMC Complementary and Alternative Medicine*, 16(1). <https://doi.org/10.1186/s12906-016-1452-y>
- Wirastuti, M. D. G., Falah, N. S., & Syaefudin, N. (2022). The Inhibitory Activity and Kinetics of α -Glucosidase by *Toona sinensis* Stem Bark Extracts. *CB : Current Biochemistry*, 9(1), 16–25. <https://doi.org/10.29244/cb.9.1.2>
- World Health Organization. (2023). Diabetes. Retrieved from World Health Organization website: <https://www.who.int/health-topics/diabetes>
- Yedjou, C. G., Grigsby, J., Mbemi, A., Nelson, D., Mildort, B., Lekan Latinwo, & Tchounwou, P. B. (2023). The Management of Diabetes Mellitus Using

- Medicinal Plants and Vitamins. *International Journal of Molecular Sciences*, 24(10), 9085–9085. <https://doi.org/10.3390/ijms24109085>
- Yuca, H., Özbek, H., Demirezer, L. Ö., Sevindik, H. G., Kazaz, C., & Güvenalp, Z. (2021). α -Glucosidase and α -amylase inhibitory potential of main compounds and drug candidates from *Elaeagnus rhamnoides* (L.) A. Nelson. *Chemical Papers/Chemicke Zvesti*, 76(2), 913–922. <https://doi.org/10.1007/s11696-021-01904-4>
- Zhang, L., Gao, H., Baba, M., Okada, Y., Okuyama, T., Wu, L., & Zhan, L. (2014). Extracts and compounds with anti-diabetic complications and anti-cancer activity from *Castanea mollissima* Blume (Chinese chestnut). *BMC Complementary and Alternative Medicine*, 14(1). <https://doi.org/10.1186/1472-6882-14-422>
- Zhang, M., Feng, R., Yang, M., Qian, C., Wang, Z., Liu, W., & Ma, J. (2019). Effects of metformin, acarbose, and sitagliptin monotherapy on gut microbiota in Zucker diabetic fatty rats. *BMJ Open Diabetes Research & Care*, 7(1), e000717. <https://doi.org/10.1136/bmjdrc-2019-000717>
- Zhang, Z., Zhang, S., Lui, C. N.-P., Zhu, P., Zhang, Z., Lin, K., ... Yung, K. K.-L. (2019). Traditional Chinese medicine-based neurorestorative therapy for Alzheimer's and Parkinson's disease. *Journal of Neurorestoratology*, 7(4), 207–222. <https://doi.org/10.26599/jnr.2019.9040026>
- Zheng, L., Meng, J., Jiang, K., Lan, H., Wang, Z., Lin, M., ... Mu, Y. (2022). Improving protein–ligand docking and screening accuracies by

incorporating a scoring function correction term. *Briefings in Bioinformatics*. <https://doi.org/10.1093/bib/bbac051>

