

## DAFTAR PUSTAKA

- Afladhanti, P. M., Romadhan, M. D., Hamzah, H. A., & Bhelqis, Q. 2022. Molecular Docking Study of Garcinia Mangostana (Mangosteen) Compounds as Sars-Cov-2 Potential Inhibitors. *Sriwijaya Journal of Medicine*. 5(1): 31-40.
- Agu, P.C., Afiukwa, C. A., Orji, O. U., Ezeh, E. M., Ofoke, I. H., Ogbu, C. O. O., Ugwuja, E. I. U., & Aja, P. M. 2023. Molecular Docking as a Tool for The Discovery of Molecular Targets of Nutraceuticals in Diseases Management. *Scientific Reports*. 13: 13398.
- Ahire, E. D., Sonawane, V. N., Surana, K. R., & Talele, G. S. 2021. *Drug Discovery, Drug-Likeness Screening, & Bioavailability: Development of Drug-Likeness Rule for Natural Products*. In Applied Pharmaceutical Practice and Nutraceuticals (pp. 191-208). Apple Academic Press.
- Akash, S., Abdelkrim, G., Bayil, I., Hosen, M. E., Mukerjee, N., Shater, A. F., Saleh, F. M., Albadrani, G., Al-Ghadi, M. Q., Abdel-Daim, M. M., & Tok, T. T. 2023. Antimalarial Drug Discovery Against Malaria Parasites Through Haplopine Modification: An Advanced Computational Approach. *Journal Of Cellular and Molecular Medicine*. 27(20): 3168-3188.
- Akbar, N. A., Amin, S., & Wulandari, W. T. 2022. Studi *In Silico* Senyawa Yang Terkandung Dalam Tanaman Daun Sirih Merah (*Piper Crocatum Ruiz & Pav*) Sebagai Kandidat Anti Sars Cov-2. *Prosiding Seminar Nasional Diseminasi Hasil Penelitian Program Studi S1 Farmasi*. 2(1).
- Al Amin, M., Ekstrak, E., Annona, D., Terhadap, M., Najib, A., Syahbana, A., Keperawatan, D., & Banyuwangi, S. 2023. Efektivitas Ekstrak Daun Annona Muricata Terhadap Penurunan Kolesterol Total Pada Lansia Dengan Hiperkolesterolemia Di Panti Werdha Mojopahit Mojokerto. *Profesional Health Journal*. 5(1): 80-89.
- Al Noman, A., Sharma, P. D., Mim, T. J., Al Azad, M., & Sharma, H. 2024. Molecular Docking and Admet Analysis of Coenzyme Q10 As A Potential Therapeutic Agent For Alzheimer's Disease. *Aging Pathobiology and Therapeutics*. 6(4): 170-182.
- Alanazi, J., Unnisa, A., Ahmad, S., Itumalla, R., Alanazi, M., Alharby, T. N., Anwar, S., Younes, K. M., Hussain, T., Hussain, A., Elamine, B. A., & Mohamed, O. A. 2022. Significance of Orlistat in Management of Dyslipidemia, Systolic Blood Pressure and Body Mass Index. *European Review for Medical & Pharmacological Sciences*. 26(22).
- Alfian, M. A. 2021. Budidaya Padi Hitam (*Oryza sativa, L. indica*) Dengan Metode Tanam Jajar Legowo 4: 1 Di Teaching Farm Politeknik Negeri Lampung. *Skripsi*. Politeknik Negeri Lampung, Lampung.
- Alghamdi, O. A. 2023. The Protective Effects of Betanin Against Experimental Gastric Ulcer by Reduction of Ros and Suppression of Inflammatory

- Genes Via Nf-Kb, Inos, Cox-2 And Tnf-A Pathways. *Journal of Chemistry and Nutritional Biochemistry*. 4(2): 51-72.
- Al-Halbosy, A. T., Hamada, A. A., Faihan, A. S., Saleh, A. M., Yousef, T. A., Abou-Krishna, M. M., Alhalafi, M. H., & Al-Janabi, A. S. 2023. Thiourea Derivative Metal Complexes: Spectroscopic, Anti-Microbial Evaluation, Admet, Toxicity, And Molecular Docking Studies. *Inorganics*. 11(10): 390.
- Al-Mohaya, M., Mesut, B., Kurt, A., & Çelik, Y. S. 2024. *In Silico* Approaches Which Are Used in Pharmacy. *Journal of Applied Pharmaceutical Science*. 14(4): 239-253.
- Al-Najjar, B. O., Elshibani, F., Sharkasi, M. A., Shintiri, N. E., Naili, E. E., Abdulsayid, M., Abozayed, R. S., & Mohammed, H. A. 2025. Phytochemical Analysis, Bioactivity, and Molecular Docking Studies of *Myrtus Communis* L. Seeds and Fruit Peel Extracts Demonstrating Antioxidant and Anti-Tyrosinase Properties. *Scientific Reports*. 15(1): 5634.
- Alnuaimi, A., Ajayi, F. F., Hamdi, M., Mudgil, P., Kamal, H., Gan, C. Y., & Maqsood, S. 2023. A Comparative Analysis of Anti-Lipidemic Potential of Soybean (*Glycine Max*) Protein Hydrolysates Obtained from Different Ripening Stages: Identification, and Molecular Interaction Mechanisms of Novel Bioactive Peptides. *Food Chemistry*. 402: 134192.
- Aloui, M., Mujwar, S., Er-Rahmani, S., Abuelizz, H. A., Er-Rajy, M., Zarougui, S., & Elhallaoui, M. 2024. Design of Novel Potent Selective Survivin Inhibitors Using 2D-QSAR Modeling, Molecular Docking, Molecular Dynamics, and ADMET Properties of New MX-106 Hydroxyquinoline Scaffold Derivatives. *Heliyon*. 10(19).
- Ameji, P. J., Uzairu, A., Shallangwa, G. A., & Uba, S. 2023. Molecular Docking-Based Virtual Screening, Drug-Likeness, and Pharmacokinetic Profiling of Some Anti-Salmonella Typhimurium Cephalosporin Derivatives. *Journal of Taibah University Medical Sciences*. 18(6): 1417-1431.
- Amin, S., Rosmiyati, R., Aprilia, A. Y., Adlina, S., & Prasetyo, A. 2023. Penambatan Senyawa Antivirus Pada Reseptor Non Structural Protein Sebagai Agen Terapeutik Covid-19. *Jurnal Kesehatan Bakti Tunas Husada: Jurnal Ilmu-Ilmu Keperawatan, Analis Kesehatan Dan Farmasi*. 23(1).
- Amogne, N. Y., Ayele, D. W., & Tsigie, Y. A. 2020. Recent Advances in Anthocyanin Dyes Extracted from Plants for Dye Sensitized Solar Cell. *Materials For Renewable and Sustainable Energy*, 9(4): 23.
- Andreadou, I., Iliodromitis, E. K., Lazou, A., Görbe, A., Giricz, Z., Schulz, R., & Ferdinandy, P. 2017. Themed Section: Redox Biology and Oxidative Stress in Health and Disease. *British Journal of Pharmacology*. 174: 1555.
- Ani, R., Manohar, R., Anil, G., & Deepa, O. S. 2018. Virtual Screening of Drug Likeness Using Tree Based Ensemble Classifier. *Biomed Pharmacol J*. 11(3).
- Anugrah, R., Mumtaz, R. K., & Suryasaputra, D. 2020. Study In-Silico Oleanane Triterpenoids in *Aquilaria* spp. as a Covid-19 Antiviral. In *IOP Conference Series: Earth and Environmental Science*. 1104 (1): 1-7.

- Aoki, M., & Sato, N. 2018. Fatty Acid Content and Composition of Triacylglycerols of *Chlorella Kessleri*. *Bio-Protocol*. 8(1).
- Apridamayanti, P., Pratiwi, R., Purwestri, Y. A., Tunjung, W. A. S., & Rumiayati, R. 2017. Anthocyanin, Nutrient Contents, and Antioxidant Activity of Black Rice Bran of *Oryza Sativa* L. 'Cempo Ireng' from Sleman, Yogyakarta, Indonesia. *Indonesian Journal of Biotechnology*. 22(1): 49-54.
- Ardian, J., Jauhari, M. T., & Rahmiati, B. F. 2020. Pengaruh Pemberian Jus Jambu Biji Merah terhadap Penurunan Kadar Ldl (Low Density Lipoprotein) dan Kolesterol Total. *Nutriology: Jurnal Pangan, Gizi, Kesehatan*. 1(1): 26-34.
- Aryasa, I. W. T., Indis, N. A., Rahmawati, Musrifah, Fitriana, W. D., Fahmi, A., Anurogo, D., Mariadi, P. D., Rosyadi, A. S. A., Rasyid, N. Q., Rochyani, N., & Lestar, L. P. 2023. *Kimia Kehidupan*. Padang: Get Press Indonesia.
- Asmara, A. P., Hernawan, H., & Nuzlia, C. 2024 *In Silico* Analysis of Antibacterial Activity of Fatty Acids in *Swietenia humilis Zucc.* Seed Extract Against *Staphylococcus aureus sortase A* enzyme. *JKPK (Jurnal Kimia dan Pendidikan Kimia)*. 9(2): 227-242.
- Ayvaz, H., Cabaroglu, T., Akyildiz, A., Pala, C. U., Temizkan, R., Ağçam, E., Ayvaz, Z., Durazzo, A., Lucarini, M., Direito, R., & Diaconeasa, Z. 2022. Anthocyanins: Metabolic Digestion, Bioavailability, Therapeutic Effects, Current Pharmaceutical/Industrial Use, and Innovation Potential. *Antioxidants*. 12(1): 48.
- Azizah, N. 2023. Pengaruh Konsentrasi Elisitor dan Waktu Elisitasi Terhadap Total Antosianin, Aktivitas Antioksidan, dan GABA Beras Hitam (*Oryza sativa* L.). *Skripsi*. Fakultas Pertanian, Universitas Hasanuddin.
- Baila-Rueda, L., Pérez-Ruiz, M. R., Jarauta, E., Tejedor, M. T., Mateo-Gallego, R., Lamiquiz-Moneo, I., de Castro Orós, I., Cenarro, A., & Civeira, F. 2016. Cosegregation of Serum Cholesterol with Cholesterol Intestinal Absorption Markers in Families with Primary Hypercholesterolemia without Mutations in LDLR, APOB, PCSK9, and APOE Genes. *Atherosclerosis*. 246: 202–207.
- Bansal, A. B., Patel, P., & Al Khalili, Y. 2024. *Orlistat*. In StatPearls: StatPearls Publishing.
- Baroroh, U., Biotek, M., Muscifa, Z. S., Destiarani, W., Rohmatullah, F. G., & Yusuf, M. 2023. Molecular Interaction Analysis and Visualization of Protein-Ligand Docking using Biovia Discovery Studio Visualizer. *Indonesian Journal of Computational Biology (IJCB)*. 2(1): 22-30.
- Bela, A., Dewi, T. T., Prabawa, S., Khatib, A., Latief, M., & Tarigan, I. L. 2024. *In Silico* Study of Bioactive Compounds of Putat Leaf Extract (*Planchonia valida*) as Anti-Cancer Against the VEGFR2 Receptor. *Journal of The Indonesian Society of Integrated Chemistry*. 16(1): 1-14.
- Benet, L. Z., Hosey, C. M., Ursu, O., & Oprea, T. I. 2016. BDDCS, the Rule of 5 and drugability. *Advanced Drug Delivery Reviews*. 101: 89-98.

- Bennett, C., Sookwong, P., Jakmune, J., & Mahatheeranont, S. 2021. Smartphone Digital Image Colorimetric Determination of the Total Monomeric Anthocyanin Content in Black Rice via the pH Differential Method. *Analytical Methods*. 13: 3348–3358.
- Bergsell, P. 2022. Encapsulation of Probiotic Bacteria in an Oleogel. *Thesis*. Department of Food Technology, Engineering and Nutrition Lund University, Sweden.
- Bhalekar, S. M., & Raskar, S. V. 2025. Molecular Docking Studies of Some Pyridazinone Derivatives. *World Journal of Pharmaceutical Research*. 14(8): 1065-1075.
- Bharata, A. A., Wibisono, S., & Ekoputranto, J. N. 2021. Lama Diabetes Melitus Terhadap Peripheral Artery Disease di RSUD Dr. Soetomo. *Jurnal Kesehatan Soetomo*. 8(3): 128-132.
- Cañamares-Orbis, P., Bernal-Monterde, V., Sierra-Gabarda, O., Casas-Deza, D., Garcia-Rayado, G., Cortes, L., & Lué, A. 2021. Impact of Liver and Pancreas Diseases on Nutritional Status. *Nutrients*. 13(5): 1650.
- Carpenter, K. A., & Altman, R. B. 2024. Databases of Ligand-Binding Pockets and Protein-Ligand Interactions. *Computational & Structural Biotechnology Journal*. 23: 1320-1338.
- Carreiro, A. L. 2018. Regulation Of Intestinal Lipid Storage and Mobilization. *Dissertation*. Department of Nutrition Science West Lafayette, Indiana
- Celik, S., Albayrak, A. T., Akyuz, S., & Ozel, A. E. 2020. Synthesis, Molecular Docking and Admet Study of Ionic Liquid as Anticancer Inhibitors of Dna and Cox-2, Topii Enzymes. *Journal Of Biomolecular Structuree and Dynamics*. 38(5): 1354-1364.
- Cerqueira, N. M. F. S. A., Oliveira, E. F., Gesto, D. S., Santos-Martins, D., Moreira, C., Moorthy, H. N., Ramos, M. J., & Fernandes, P. A. 2016. Cholesterol Biosynthesis: a Mechanistic Overview. *Biochemistry*. 55(39): 5483-5506.
- Chen, R., Yin, C., Fang, J., & Liu, B. 2021. The NLRP3 Inflammasome: An Emerging Therapeutic Target for Chronic Pain. *Journal of Neuroinflammation*. 18: 1-12
- Chen, X., Yang, Y., Yang, X., Zhu, G., Lu, X., Jia, F., Diao, B., Yu, S., Ali, A., Zhang, H., Xu, P., Liao, Y., Sun, C., Zhou, H., Liu, Y., Wang, Y. 2022. Investigation of Flavonoid Components and Their Associated Antioxidant Capacity in Different Pigmented Rice Varieties. *Food Research International*. 161: 111726. <https://doi.org/10.1016/j.foodres.2022.111726>.
- Chiu, C. Y., Huang, S. Y., Tzen, J. T., & Liu, P. F. 2025. Mechanism of Pancreatic Lipase Inhibition by Strictinin Purified from Pu'er Tea. *Food Bioscience*. 69: 106954.
- Cordeiro, R., Khan, S., Tajir, H., Bagwan, A., Shaikh, M. A., & Gupta, A. 2022. Admet Prediction of Synthesized Heterocyclic Derivatives to Treat Renal Cancer. *German Journal of Pharmaceuticals and Biomaterials*. 1(3): 14-43.

- 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(1): 42717.
- D'Aquila, T., Hung, Y. H., Carreiro, A., & Buhman, K. K. 2016. Recent Discoveries on Absorption of Dietary Fat: Presence, Synthesis, and Metabolism of Cytoplasmic Lipid Droplets within Enterocytes. *Biochimica et Biophysica Acta (BBA)-Molecular & Cell Biology of Lipids*. 1861(8): 730-747.
- Das, M., Dash, U., Mahanand, S. S., Nayak, P. K., & Kesavan, R. K. 2023. Black Rice: A Comprehensive Review on Its Bioactive Compounds, Potential Health Benefits and Food Applications. *Food Chemistry Advances*. 3: 100462.
- Das, S. S., Kumari, T., Babu, S., C, N., Kumar, S., Deka, S. C. 2025. Bioactive Compounds, Functional Properties, Health Benefits, and Food Applications of Black Rice: A Comprehensive Review. *Food Chemistry Advances*. 7: 101028. <https://doi.org/10.1016/j.focha.2025.101028>.
- Ding, X., Zhang, W., Li, S., & Yang, H. 2019. The Role of Cholesterol Metabolism in Cancer. *Am J Cancer Res*. 9(2).
- Dong, Y., Wu, X., Han, L., Bian, J., He, C., El-Omar, E., Gong, L., & Wang, M. 2022. The Potential Roles of Dietary Anthocyanins in Inhibiting Vascular Endothelial Cell Senescence and Preventing Cardiovascular Diseases. *Nutrients*. 14(14): 2836.
- Dragano, N. R. V., Fernø, J., Diéguez, C., López, M., & Milbank, E. 2020. Recent Updates on Obesity Treatments: Available Drugs and Future Directions. *Neuroscience*. 437: 215-239.
- DrugBank. 2005. (Hydroxyethyloxy)tri(ethyloxy)octane. Retrieved October, 27 2025, from <https://go.drugbank.com/drugs/db04233>
- Du, H., Wu, J., Ji, K. X., Zeng, Q. Y., Bhuiya, M. W., Su, S., Shu, Q. Y., Ren, H. X., Liu, Z. A., & Wang, L. S. 2015. Methylation Mediated by an Anthocyanin, O-Methyltransferase, Is Involved in Purple Flower Coloration in Paeonia. *Journal of Experimental Botany*. 66(21): 6563-6577.
- Duarte, L. J., Chaves, V. C., Nascimento, M. V. P. dos S., Calvete, E., Li, M., Ciraolo, E., Ghigo, A., Hirsch, E., Simões, C. M. O., Reginatto, F. H., & Dalmarco, E. M. 2018. Molecular Mechanism of Action of Pelargonidin-3-O-Glucoside, the Main Anthocyanin Responsible for the Anti-Inflammatory Effect of Strawberry Fruits. *Food Chemistry*. 247: 56–65
- Ekowati, J., Diyah, N. W., Nofianti, K. A., & Hamid, I. S. 2018. Molecular Docking of Ferulic Acid Derivatives on P2Y12 Receptor and Their ADMET Prediction. *Journal of Mathematical & Fundamental Sciences*. 50(2): 203-219.
- Ekowati, J., Diyah, N. W., Nofianti, K. A., & Hamid, I. S. 2018. Molecular Docking of Ferulic Acid Derivatives on P2Y12 Receptor and Their Admet Prediction. *Journal of Mathematical and Fundamental Sciences*. 50(2): 203-219.

- El-Sayyad, H. I., Elmansi, A. A., & Bakr, E. H. 2015. Hypercholesterolemia-Induced Ocular Disorder: Ameliorating Role of Phytotherapy. *Nutrition*. 31(11-12): 1307-1316.
- Engelking, L. R. 2015. *Textbook of Veterinary Physiological Chemistry (Third Edition)*. <https://doi.org/10.1016/C2010-0-66047-0>.
- Faozah, N., Nasihun, T., Chodidjah, C., Sumarawati, T., Pertiwi, D., & Widodo, J. W. 2021. Pengaruh Pemberian N-Acetylcystein Terhadap Kadar Hormon Testosteron pada Hiperkolesterolemia. *Jurnal Litbang Edusaintech*. 2(1): 8–12.
- Faqi, A. S. 2017. *A Comprehensive Guide to Toxicology in Nonclinical Drug Development*. Academic Press.
- Feingold, K. R. 2023. Obesity and Dyslipidemia. In Endotext: MDText.com. <https://www.ncbi.nlm.nih.gov/books/NBK305895/>
- Feingold, K. R. 2024. *Introduction to Lipids & Lipoproteins*. In Endotext: MDText.com. <https://www.ncbi.nlm.nih.gov/books/NBK305896/>.
- Forsan, H. F., & Awad, S. S. 2023. *Cyanidin: Advances on Resources, Biosynthetic Pathway, Bioavailability, Bioactivity, & Pharmacology*. In *H&book of Dietary Flavonoids (pp. 1-50)*. Cham: Springer International Publishing.
- Frimayanti, N. 2020. Simulasi Molecular Dynamic (Md) Senyawa Analog Kalkon Sebagai Inhibitor Untuk Sel Kanker Paru A549. *Jurnal Penelitian Farmasi Indonesia*. 9(2): 56-60.
- Gadaleta, D., Vuković, K., Toma, C., Lavado, G. J., Karmaus, A. L., Mansouri, K., Kleinstreuer, N. C., Benfenati, E., & Roncaglioni, A. 2019. Sar And Qsar Modeling of A Large Collection Of Ld50 Rat Acute Oral Toxicity Data. *Journal Of Cheminformatics*. 11(1): 58.
- Gaudet, D. 2024. 35 - Special Patient Populations: Treatment of Familial Chylomicronemia Syndrome and Sustained Chylomicronemia. In *Companion to Braunwald's Heart Disease, Clinical Lipidology (Third Edition)*: 336-344.e2. <https://doi.org/10.1016/B978-0-323-88286-6.00035-2>.
- GBIF.org. 2023. *Oryza sativa* L. in GBIF Backbone Taxonomy. <https://www.gbif.org/species/2703459>
- Gimeno, A., Ojeda-Montes, M. J., Tomás-Hernández, S., Cereto-Massagué, A., Beltrán-Debón, R., Mulero, M., Pujadas, G., & Garcia-Vallvé, S. 2019. The Light and Dark Sides of Virtual Screening: What Is There to Know? *International Journal of Molecular Sciences*. 20(6): 1375.
- Glisan, S. L., Grove, K. A., Yennawar, N. H., & Lambert, J. D. 2017. Inhibition of Pancreatic Lipase by Black Tea Theaflavins: Comparative Enzymology and *In Silico* Modeling Studies. *Food Chemistry*. 216: 296-300.
- Gonçalves, G. R. F., Gandolfi, O. R. R., Brito, M. J. P., Bonomo, R. C. F., Fontan, R. D. C. I., & Veloso, C. M. 2021. Immobilization of Porcine Pancreatic Lipase on Activated Carbon by Adsorption and Covalent Bonding and Its Application in the Synthesis of Butyl Butyrate. *Process Biochemistry*. 111: 114-123.
- Gouthami, K., Veeraraghavan, V., & Nagaraja, P. 2022. In-Silico Characterization of Phytochemicals Identified from Vitex Negundo (L) Extract as Potential

- Therapy for Wnt-Signaling Proteins. *Egyptian Journal of Medical Human Genetics*. 23(1): 3.
- Habibi, F., García-Pastor, M. E., Puente-Moreno, J., Garrido-Auñón, F., Serrano, M., & Valero, D. 2023. Anthocyanin in Blood Oranges: A Review on Postharvest Approaches for Its Enhancement and Preservation. *Critical Reviews in Food Science & Nutrition*. 63(33): 12089-12101.
- Hafshah, M., Firdaus, I. M., Fitriani, I. N., & Rahmawati, L. 2024. QSAR, Molecular Docking, and Molecular Dynamic of Novel Coumarin Derivatives as  $\alpha$ -Glucosidase Inhibitor. *Jurnal Kimia Sains dan Aplikasi*. 27(7): 316-327.
- Hamooya, B. M., Siame, L., Muchaili, L., Masenga, S. P., & Kirabo, A. 2025. Metaboilc Syndrome: Epidemiology, Mechanisms, and Current Therapeutic Approaches. *Frontiers Nutrition*. DOI: 10.3389/fnut.2025.1661603
- Hamria, H., Mien, M., & Saranani, M. 2020. Hubungan Pola Hidup Penderita Hipertensi Dengan Kejadian Hipertensi di Wilayah Kerja Puskesmas Batalaiworu Kabupaten Muna. *Jurnal Keperawatan*. 4(1): 17-21.
- Han, F. L., & Xu, Y. 2015. Effect of the Structuree of Seven Anthocyanins on Self-Association and Colour in an Aqueous Alcohol Solution. *South African Journal of Enology & Viticulture*. 36(1): 105-116.
- Han, F., Yang, P., Wang, H., Fernandes, I., Mateus, N., & Liu, Y. 2019. Digestion and Absorption of Red Grape and Wine Anthocyanins Through the Gastrointestinal Tract. *Trends in Food Science & Technology*. 83: 211-224.
- Hartati, F. K., Widjanarko, S. B., Widyaningsih, T. D., & Rifa'i, M. 2017. Anti-Inflammatory Evaluation of Black Rice Extract Inhibits TNF- $\alpha$ , IFN- $\gamma$  and IL-6 Cytokines Produced by Immunocompetent Cells. *Food & Agricultural Immunology*. 28(6): 1116-1125.
- Hasan, R., & Herowati, R. 2024. Molecular Docking and Pharmacokinetic Studies of Moringa Oleifera as Angiotensin-Converting Enzyme Inhibitors. *Pharmacy & Pharmaceutical Sciences Journal*. 11(1): 80-88.
- Hassen, C. B., Goupille, C., Vigor, C., Durand, T., Guéraud, F., Silvente-Poirot, S., Pairot, M., & Frank, P. G. 2023. Is Cholesterol a Risk Factor for Breast Cancer Incidence and Outcome? *The Journal of Steroid Biochemistry & Molecular Biology*. 232: 106346.
- Hastuty, Y. D. 2015. Perbedaan Kadar Kolesterol Orang Yang Obesitas Dengan Orang Yang Non Obesitas. *Averrous: Jurnal Kedokteran Dan Kesehatan Malikussaleh*. 47-55.
- Helgadottir, A., Thorleifsson, G., Alexandersson, K. F., Tragante, V., Thorsteinsdottir, M., Eiriksson, F. F., Gretarsdottir, S., Björnsson, E., Magnusson, O., Sveinbjornsson, G., Jonsdottir, I., Steinthorsdottir, V., Ferkingstad, E., Jensson, B. Ö., Stefansson, H., Olafsson, I., Christensen, A. H., Torp-Pedersen, C., Køber, L., Pedersen, O. B., Erikstrup, C., Sørensen, E., Brunak, S., Banasik, K., Hansen, T. F., Nyegaard, M., Eyjolfsson, G. I., Sigurdardottir, O., Thorarinsson, B. L., Matthiasson, S. E., Steingrimsdottir, T., Bjornsson, E. S., Danielsen, R., Asselbergs, F. W.,

- Arnar, D. O., Ullum, H., Bundgaard, H., Sulem, P., Thorsteinsdottir, U., Thorgeirsson, G., Holm, H., Gudbjartsson, D. F., & Stefansson, K. 2020. Genetic Variability in The Absorption of Dietary Sterols Affects the Risk of Coronary Artery Disease. *European Heart Journal*. 41(28): 2618-2628.
- Hindami, F. T., Da'i, M., Fauzi, A., & Wulandari, F. 2024. Studi Docking Molekuler Senyawa [(5-Prop-2-enylpyrimidin-2-yl) propanoate] dan [4-((1E)-buta-1, 3-dienyl) phenol] Terhadap Protein Er- $\alpha$ , Er- $\beta$ , dan IKK sebagai Agen Sitotoksik. *Jurnal Farmasetis*. 13(3): 99-110.
- Hsu, C. Y., Wang, P. W., Alalaiwe, A., Lin, Z. C., & Fang, J. Y. 2019. Use Of Lipid Nanocarriers to Improve Oral Delivery of Vitamins. *Nutrients*. 11(1): 68.
- Huang, J., Chen, S., Cai, D., Bian, D., & Wang, F. 2018. Long Noncoding RNA lncARSR Promotes Hepatic Cholesterol Biosynthesis Via Modulating Akt/SREBP-2/HMGCR Pathway. *Life Sciences*. 203: 48-53.
- Huff, T., Boyd, B., & Jialal, I. 2023. *Physiology, cholesterol*. In StatPearls: StatPearls Publishing. <https://www.ncbi.nlm.nih.gov/books/NBK470561/>
- Huo, X. D., Qin, X. Y., Hou, J., Tang, H., & Ge, G. B. 2022. The Potential of Natural Sources for Pancreatic Lipase Inhibitors: A Solution of The Obesity Crisis?. *Expert Opinion on Drug Discovery*. 17(12): 1295-1298.
- Husain, A., Chanana, H., Khan, S. A., Dhanalekshmi, U. M., Ali, M., Alghamdi, A. A., & Ahmad, A. 2022. Chemistry and Pharmacological Actions of Delphinidin, a Dietary Purple Pigment in Anthocyanidin and Anthocyanin Forms. *Frontiers in Nutrition*. 9: 746881.
- Ibrahim, M. A., Asuka, E., & Jialal, I. 2023. *Hypercholesterolemia*. In StatPearls: StatPearls Publishing.
- Ibrahim, M., Asuka, E., & Jialal, I. 2021. *Hypercholesterolemia Pathophysiology*. In StatPearls: StatPearls Publishing
- Iqbal, S., Omara, T., Kahwa, I., *et al.* 2024. Anticancer Potential of Delphinidin and Its Derivatives: Therapeutic and Mechanistic Insights. *Medical Chemistry Research*. 33: 1769–1786. <https://doi.org/10.1007/s00044-024-03296-y>
- Islam, A., Jena, D., Mondal, N. S., Teli, A., Mondal, S., & Gautam, M. K. 2025. In-Silico Approaches for Drug Designing Technology: Bridging Discovery and Development. *Current Drug Discovery Technologies*. 22(5): 14.
- Ito, V. C., & Lacerda, L. G. 2019. Black Rice (*Oryza sativa* L.): A Review of Its Historical Aspects, Chemical Composition, Nutritional and Functional Properties, and Applications and Processing Technologies. *Food Chemistry*. 301: 125304.
- Ivanović, V., Rančić, M., Arsić, B., & Pavlović, A. 2020. Lipinski's Rule of Five, Famous Extensions and Famous Exceptions. *Popular Scientific Article*. 3(1): 171-177.
- Jadar, P. G., & Haritha, M. M. 2025. Evaluation Of Phytochemicals from *Azadirachta Indica* for Drug-Like Properties: A Computational Insight into Natural Product-Based Drug Discovery. *Journal Of Ayurveda and Holistic Medicine (Jahm)*. 13(8): 63-78.
- Javed, M., Ahmed, W., Khan, A., & Rabbani, I. 2023. Comparison of Efficacy of Fermented Garlic and Orlistat (Lipase Inhibitor) in Obesity Management Using an Experimental Rodent Model. *Food*. 12(21): 3905.

- Karim, N., Shishir, M. R. I., Li, Y., Zineb, O. Y., Mo, J., Tangpong, J., & Chen, W. 2022. Pelargonidin-3-*O*-Glucoside Encapsulated Pectin-Chitosan-Nanoliposomes Recovers Palmitic Acid-Induced Hepatocytes Injury. *Antioxidants*. 11(4): 623.
- Kaur, A., Purewal, S. S., Swamy, C. T., & Sen, A. 2025. Harnessing the Power of Black Rice Anthocyanins: A Review in Context of Extraction and Chromatographic Techniques. *Journal of Food Quality*. 2025(1): 4005156.
- Khatab, T. K., & Hassan, A. S. 2023. Computational Molecular Docking and *In Silico* Admet Prediction Studies of Pyrazole Derivatives as Covid-19 Main Protease (Mpro) And Papain-Like Protease (Plpro) Inhibitors. *Bulletin Of the Chemical Society of Ethiopia*. 37(2): 449-461.
- Kim, G. R., Jung, E. S., Lee, S., Lim, S. H., Ha, S. H., & Lee, C. H. 2014. Combined Mass Spectrometry-Based Metabolite Profiling of Different Pigmented Rice (*Oryza sativa* L.) Seeds and Correlation with Antioxidant Activities. *Molecules*. 19: 15673-15686.
- Kowalczyk, T., Muskała, M., Merecz-Sadowska, A., Sikora, J., Picot, L., & Sitarek, P. 2024. Anti-Inflammatory and Anticancer Effects of Anthocyanins in In Vitro and In Vivo Studies. *Antioxidants*. 13(9): 1143.
- Kraft, P., Schuhmann, M. K., Garz, C., Jandke, S., Urlaub, D., Mencl, S., Zerneck, A., Heinze, H. J., Carare, R. O., Kleinschnitz, C., & Schreiber, S. 2017. Hypercholesterolemia Induced Cerebral Small Vessel Disease. *PLoS ONE*. 12(8).
- Kuasnei, M., Leonarski, E., Dartora, M., Bredun, M. A., Burin, V. M., Cesca, K., de Oliveira, D., Sayer, C., & Zielinski, A. A. F. 2025. In Vitro Antioxidant, Antiglycemic, and Antitumor Potential of Anthocyanin-Rich Extracts from Black Bean Hulls Obtained by Pressurized Liquid Extraction. *ACS Food Science & Technology*. 5(2).
- Kumar, N., Srivastava, R., Mongre, R. K., Mishra, C. B., Kumar, A., Khatoon, R., Banerje, A., Ashraf-Uz-Zaman, Md., Singh, H., Lynn, A. M., Lee, M. S., & Prakash, A. 2022. Identifying The Novel Inhibitors Against the Mycolic Acid Biosynthesis Pathway Target “Mtfabh” Of Mycobacterium Tuberculosis. *Frontiers In Microbiology*. 13: 818714.
- Lang, H., Jia, X., He, B., & Yu, X. 2025. Advances and Future Prospects of Pigment Deposition in Pigmented Rice. *Plants*. 14(6): 963.
- Lee, B. K., Lee, W. J., & Jung, Y. S. 2017. Chrysin Attenuates VCAM-1 Expression and Monocyte Adhesion in Lipopolysaccharide-Stimulated Brain Endothelial Cells by Preventing NF- $\kappa$ B Signaling. *International Journal of Molecular Sciences*. 18(7): 1424.
- Li, J., Wang, B., He, Y., Wen, L., Nan, H., Zheng, F., Liu, H., Lu, A., Wu, M., & Zhang, H. 2021. A Review of The Interaction Between Anthocyanins and Proteins. *Food Science and Technology International*. 27(5): 470-482.
- Li, X., Li, F., Zeng, Y., Zhang, H., & Tang, Y. 2025. Encapsulated Black Rice Anthocyanins by Mildly Heat-Induced Egg Yolk Immunoglobulin and Fucoidan with Electrostatic Interaction to Enhance Stability and Delay the Oxidation of Yak Meat. *Food Bioscience*. 107127.

- Lim, S. Y., Steiner, J. M., & Cridge, H. 2022. Lipases: It's Not Just Pancreatic Lipase! *American Journal of Veterinary Research*. 83(8).
- Lin, X., Li, X., & Lin, X. 2020. A Review on Applications of Computational Methods in Drug Screening and Design. *Molecules*. 25(6): 1375.
- Lipinski CA. 2004. Lead profiling Lead and Drug-Like Compounds: The Rule-Of-Five Revolution Drug Discov. *Today Technol*. 1(4):337–341.
- Liu, D., Zhang, H., Dai, Y., Sun, J., Sun, H., Yu, Z., Kong, F., & Feng, X. 2024. Cyanidin-3-O-Glucoside Ameliorates Hydrogen Peroxide-Induced Oxidative Stress by Regulating HMGCR-Mediated Cholesterol Anabolism in HEK-293T Cells. *Food Science & Nutrition*. 12(9): 6673-6689.
- Liu, H., Liu, Z., Wu, Y., Zheng, L., & Zhang, G. 2021. Regulatory Mechanisms of Anthocyanin Biosynthesis in Apple and Pear. *International Journal of Molecular Sciences*. 22(16): 8441.
- Liu, S., Ma, C., Zhang, Y., Wang, Y., Tian, J., Li, B., & Zhao, J. 2024. Different Processing Methods on Anthocyanin Composition and Antioxidant Capacity in Blueberry Juice: Based On Metabolomics And DFT Analysis. *Efood*. 5(1): e131.
- Liu, T., Zhang, L., Joo, D., & Sun, S. C. 2017. NF- $\kappa$ B Signaling in Inflammation. *Signal Transduction & Targeted Therapy*. 2(1): 1-9.
- Llop-Peiró, A., Macip, G., Garcia-Vallvé, S., & Pujadas, G. 2024. Are Protein–Ligand Docking Programs Good Enough To Predict Experimental Poses Of Noncovalent Ligands Bound To The SARS-Cov-2 Main Protease?. *Drug Discovery Today*. 29(10): 104137.
- Lucas, C. P., Boldrin, M. N., Reaven, G. M. 2003. Effect Of Orlistat Added to Diet (30% Of Calories from Fat) On Plasma Lipids, Glucose, And Insulin in Obese Patients with Hypercholesterolemia. *The American Journal of Cardiology*. 91(8): 961-964.
- Luo, J., Chen, W., Pan, Y., He, Q., Sun, J., & Bai, W. 2025. Unraveling the Color Evolution and Metabolic Pathways of Pelargonidin-3-O-Glucoside During Lactic Acid Fermentation of the Strawberry Juice Color Simulation System: A Novel Perspective Through Untargeted Metabolomics. *Food Chemistry*. 464: 141740.
- Maahury, M. F., Martoprawiro, M. A., & Wayan Sutapa, I. 2019. Computational Calculation Potency of Petunidin and Peonidin as Photosensitizer in Dye-Sensitized Solar Cell. *International J. Scientific and Research Publications (IJSRP)*. 9(11): p95108.
- MacFarlane, N. G. 2018. Digestion and Absorption. *Anaesthesia & Intensive Care Medicine*. 19(3): 125-127.
- Malik, N. A. 2016. Solubilization And Interaction Studies of Bile Salts with Surfactants and Drugs: A Review. *Applied Biochemistry and Biotechnology*. 179(2): 179-201.
- Mapoung, S., Semmarath, W., Arjsri, P., Thippraphan, P., Srisawad, K., Umsumarng, S., Phromnoi, K., Jamjodm, S., Prom-u-Thai, C., & Dejkriengkraikul, P. 2023. Comparative Analysis of Bioactive-Phytochemical Characteristics, Antioxidants Activities, and Anti-

- Inflammatory Properties of Selected Black Rice Germ and Bran (*Oryza sativa* L.) Varieties. *European Food Research & Technology*. 249(2): 451-464.
- Martin, J., Kuskoski, E. M., Navas, M. J., Asuero, A. G. 2017. *Antioxidant Capacity of Anthocyanin Pigments: Flavonoids from Biosynthesis to Human Health*. By InTech: Croatia.
- Martin, Y.C. 2005. A Bioavailability Score. *Journal of Medicinal Chemistry*. 48(9): 3164-3170.
- Martins, I. C., Maciel, M. G., Do Nascimento, J. L., Mafra, D., Santos, A. F., & Padilha, C. S. 2023. Anthocyanins-Rich Interventions on Oxidative Stress, Inflammation and Lipid Profile in Patients Undergoing Hemodialysis: Meta-Analysis and Meta-Regression. *European Journal of Clinical Nutrition*. 77(3): 316-324.
- Maulidia, N. R. 2021. Docking Oligomer Heparin 2S dan 2SNS dengan Konformasi Iduronat 2S0 pada Komplek Reseptor FGFR1-FGF2 sebagai Antikanker. *Skripsi*. Fakultas Sains dan Teknologi, Univ. Islam Negeri Maulana Malik Ibrahim, Malang.
- Maurya, N. K., Yadav, L., & Chaudhary, S. 2022. Nutraceutical Potentials of Black Rice. *Research & Reviews: Journal of Food Science & Technology*. 11(3): 27-35.
- Mazewski, C., Kim, M. S., & Gonzalez de Mejia, E. 2019. Anthocyanins, Delphinidin-3-*O*-Glucoside and Cyanidin-3-*O*-Glucoside, Inhibit Immune Checkpoints in Human Colorectal Cancer Cells In Vitro and *In Silico*. *Scientific Reports*. 9(1): 11560.
- McQuilken, S. A. 2021. Digestion and Absorption. *Anaesthesia & Intensive Care Medicine*. 22(5): 336-338. <https://doi.org/10.1016/j.mpaic.2020.12.009>.
- Merecz-Sadowska, A., Sitarek, P., Kowalczyk, T., Zajdel, K., Jęcek, M., Nowak, P., & Zajdel, R. 2023. Food Anthocyanins: Malvidin and Its Glycosides as Promising Antioxidant and Anti-Inflammatory Agents with Potential Health Benefits. *Nutrients*. 15(13): 3016.
- Mi, J., Zhang, L. T., Lu, L., Wei, J. Y., Jin, B., Luo, Q., Yan, Y. M., & Cao, Y. L. 2023. Separation and Pancreatic Lipase Inhibitory Activity of Two Petunidin Anthocyanins from *Lycium ruthenicum* Murr. by Preparative Medium-Pressure Liquid Chromatography. *CABI Databases*.
- Misran, E., Husin, F., Sa'at, A. N., Harun, A. Q., Zubairi, S. I., & Ya'akob, H. 2025. *In Silico* Evaluation of Guarana's Bioactive Compounds for Diabetes, Inflammation, and Oxidative Stress: Insights from Molecular Docking and ADMET Profiling. *Results in Chemistry*. 102394.
- Mohammed, E. R.-RAJY, El Fadili, M., Naceiri Mrabti, N., Zarougui, S., & Elhallaoui, M. 2022. QSAR, Molecular Docking, ADMET Properties *In Silico* Studies for a Series of 7-Propanamide Benzoxaboroles as Potent Anti-Cancer Agents. *Chinese Journal of Analytical Chemistry*. 50(12): 100163. <https://doi.org/10.1016/j.cjac.2022.100163>.
- Mormone, A., Tortorella, G., Esposito, F., Caturano, A., Marrone, A., Cozzolino, D., Galiero, R., Marfella, R., Sasso, F. C., & Rinaldi, L. 2024. Advances in Pharmacological Approaches for Managing Hypercholesterolemia: A

- Comprehensive Overview of Novel Treatments. *Biomedicines*. 12(2): 432. <https://doi.org/10.3390/biomedicines12020432>.
- Mosalmanzadeh, N., & Pence, B. D. 2024. Oxidized Low-Density Lipoprotein and Its Role in Immunometabolism. *International Journal of Molecular Sciences*. 25(21): 11386.
- Muhammed, M. T., & Aki-Yalcin, E. 2024. Molecular Docking: Principles, Advances, and Its Applications in Drug Discovery. *Letters in Drug Design & Discovery*. 21(3): 480-495.
- Nabila, N. A. M. S. 2022. Method Validation of Delphinidin-3-O-Glucoside Chloride in Rat Plasma by High-Performance Liquid Chromatography (HPLC). *Dissertation*. Degree of Master of Science (Biomedicine) Univ. Sains Malaysia, Malaysia.
- Narapati, A. N., & Dainy, N. C. 2024. Relationship Between Nutritional Status and Other Factors with The Incidence of Hypercholesterolemia in Adults in Cikupa. *Arsip Keilmuan Gizi (AKG)*. 1(1): 23–32.
- Nas, J. S. B., & Medina, P. M. B. 2024. Delphinidin-3-Glucoside Prolongs Lifespan and Healthspan in *Caenorhabditis Elegans* with and without Environmental Stress. *Journal of Applied Pharmaceutical Science*. 14(1): 108-113.
- Nas, J. S. B., Manalo, R. V. M., & Medina, P. M. B. 2021. Peonidin-3-Glucoside Extends the Lifespan of *Caenorhabditis Elegans* and Enhances Its Tolerance to Heat, UV, and Oxidative Stresses. *ScienceAsia*. 47(4): 457.
- Naseri, R., Farzaei, F., Haratipour, P., Nabavi, S. F., Habtemariam, S., Farzaei, M. H., Khodarami, R., Tewari, D., & Momtaz, S. 2018. Anthocyanins in the Management of Metabolic Syndrome: A Pharmacological and Biopharmaceutical Review. *Frontiers in Pharmacology*. 9: 1310.
- Nashruddin, M. H. 2021. Analisis Fungsional Senyawa Aktif Eugenol Daun Lampes Secara Sebagai Kandidat Agen Kompetitif Inhibitor ox-LDL Dalam Berikatan Dengan SR-A dan CD-36. *Skripsi*. Fakultas Kedokteran Dan Ilmu Kesehatan, Univ. Islam Negeri Maulana Malik Ibrahim, Malang.
- Nastiti, R. D. W., & Nurhidajah, N. 2020. Berat Badan, Feed Conversion Ratio (FCR), dan Berat Jaringan Adiposa pada Tikus Hiperkolesterolemia dengan Diet Beras Hitam. *Jurnal Pangan dan Gizi*. 10(2): 147-158.
- National Center for Biotechnology Information 2025. PubChem Compound Summary for CID 14311152, Peonidin 3-Glucoside. Retrieved July 11, 2025 from <https://pubchem.ncbi.nlm.nih.gov/compound/Peonidin-3-O-glucoside-chloride>.
- National Center for Biotechnology Information 2025. PubChem Compound Summary for CID 443650, Delphinidin 3-O-Glucoside Cation. Retrieved July 11, 2025 from <https://pubchem.ncbi.nlm.nih.gov/compound/Delphinidin-3-O-glucoside-cation>.
- National Center for Biotechnology Information 2025. PubChem Compound Summary for CID 443652, Malvidin 3-O-Beta-D-Glucoside. Retrieved July 11, 2025 from

- <https://pubchem.ncbi.nlm.nih.gov/compound/Malvidin-3-O-beta-D-glucoside>.
- National Center for Biotechnology Information 2025. PubChem Compound Summary for CID 443651, Petunidin 3-O-Glucoside. Retrieved July 11, 2025 from <https://pubchem.ncbi.nlm.nih.gov/compound/Petunidin-3-O-glucoside>.
- National Center for Biotechnology Information 2025. PubChem Compound Summary for CID 443648, Pelargonidin 3-Glucoside Ion. Retrieved July 11, 2025 from <https://pubchem.ncbi.nlm.nih.gov/compound/Pelargonidin-3-glucoside-ion>.
- Nations U. 2011. Globally Harmonized System of Classification and Labelling of Chemicals (GHS). p. 107–9.
- Nguyen, S. N., & Beta, T. 2024. Cereal-Derived Polyphenols and Their Bioactive Properties. *Current Opinion in Food Science*. 56: 101136.
- Nugraheni, R. W. D., Wahyono, F., & Isroli, I. 2016. Pengaruh Penambahan Ramuan Tepung Jahe Merah, Daun Sembung, Daun Katuk Dan Kencur (Jsk2) Terhadap Gambaran Lemak Darah Ayam Petelur. *Skripsi*. Fakultas Peternakan & Pertanian, Univ. Diponegoro, Semarang.
- Nur, M. S., Yudiandani, R. E., & Solikah, A. N. M. 2022. Potensi Senyawa Chromodoris sebagai Pengikat Reseptor SARS-CoV-2 secara *In Silico*. *Sains dan Matematika*. 7(2): 70-76.
- Nutricati, E., Sabella, E., Negro, C., Min Allah, S., Luvisi, A., De Bellis, L., & Accogli, R. A. 2025. Anthocyanins and Anthocyanin Biosynthesis Gene Expression in Passiflora Flower Corona Filaments. *Plants*. 14(7): 1050.
- Nuur'Alimah, S., Jannati, A. N., Ambarsari, L., & Falah, S. 2024. *In Silico* Study: Molecular Docking of SARS-Cov-2 Endoribonuclease on Active Compounds of *Gmelina arborea* Roxb. bark. *Menara Perkebunan*. 92(1): 70-81.
- Ojha, N., & Dhamoon, A. S. 2023. Myocardial infarction. In StatPearls: StatPearls Publishing.
- Olujinmi, F. E., Ajaelu, C. J., Akintelu, S. A., & Oyebamiji, A. K. 2025. Dataset on Potential Biochemical Activities of Cylo Phe-Ala-Asp-Gly-Based Compounds as Caspase 1 Inhibitor. *Data in Brief*. 60: 111503.
- Ou, R., Lin, L., Zhao, M., & Xie, Z. 2020. Action Mechanisms and Interaction of Two Key Xanthine Oxidase Inhibitors in Galangal: Combination of In Vitro and *In Silico* Molecular Docking Studies. *International Journal of Biological Macromolecules*. 162: 1526-1535.
- Ou, S. J. L., Yang, D., Pranata, H. P., Tai, E. S., & Liu, M. H. 2023. Postprandial Glycemic and Lipidemic Effects of Black Rice Anthocyanin Extract Fortification in Foods of Varying Macronutrient Compositions and Matrices. *npj Science of Food*. 7(1): 59.
- Panda, D. K., Jyotirmayee, B., & Mahalik, G. 2022. Black Rice: A Review from Its History to Chemical Makeup to Health Advantages, Nutritional Properties and Dietary Uses. *Plant Science Today*. 9: 1-15.
- Pappan, N., Awosika, A. O., & Rehman, A. 2024. *Dyslipidemia*. In StatPearls: StatPearls Publishing. <https://www.ncbi.nlm.nih.gov/books/NBK560891/>

- Park, M., Sharma, A., & Lee, H. J. 2019. Anti-Adipogenic Effects of Delphinidin-3-O- $\beta$ -Glucoside in 3T3-L1 Preadipocytes and Primary White Adipocytes. *Molecules*. 24(10): 1848.
- Peng, H., Wang, Q., Wi, X., Wang, X., & Zhao, X. 2017. Orlistat Induces Apoptosis and Protective Autophagy in Ovarian Cancer Cells: Involvement of Akt-mTOR-Mediated Signaling Pathway. *Archives of Gynecology and Obstetrics*. 298(3): 597-605.
- Permatasari, H. K., Taslim, N. A., Al Mahira, M. F. N., Amalia, N., Farradisya, S., Putri, R. R. A., Arnalia, A., Faradis, M. A. W., Yusuf, M., Gunawan, W. B., Surya, R., Mayulu, N., Tallei, T. E., Tjandrawinata, R. R., Kurniawan, R., & Nurkolis, F. 2024. A Perspective on Molecular Docking Approaches in the Discovery and Development of Natural-Based Functional Foods. *Nutrici3n Cl3nica y Diet3tica Hospitalaria*. 44(1): 84-91.
- Perwisa, I., R., & Hanriko, R. 2020. Pengaruh Pemberian Ekstrak Black Garlic (*Allium sativum*) Sebagai Penghambat Aterosklerosis Yang Diinduksi Minyak Jelantah. *Jurnal Medika Hutama*. 2(1): 213-217.
- Pham-The, H., Casa3ola-Martin, G., Garrigues, T., Bermejo, M., Gonz3lez-3lvarez, I., Nguyen-Hai, N., Cabrera-P3rez, M. 3., & Le-Thi-Thu, H. 2015. Exploring Different Strategies for Imbalanced Adme Data Problem: Case Study on Caco-2 Permeability Modeling. *Molecular Diversity*. 20(1): 93-109.
- Pradani, T. C., Fatimawali, F., Manampiring, A. E., Kepel, B. J., Budiarmo, F. D., & Bodhi, W. 2021. *Molecular Docking* Terhadap Senyawa Kurkumin Dan Arturmeron Pada Tumbuhan Kunyit (*Curcuma longa* Linn.) Yang Berpotensi Menghambat Virus Corona. *eBiomedik*. 9(2): 374927.
- Prasetiawati, R., Suherman, M., Permana, B., & Rahmawati, R. 2021. Molecular Docking Study of Anthocyanidin Compounds Against Epidermal Growth Factor Receptor (Egfr) As Anti-Lung Cancer. *Indonesian Journal of Pharmaceutical Science and Technology*. 8(1): 8-20.
- Prasetyanti, I. K., Sukardiman, S., & Suharjo, S. 2021. Molecular Docking of Mangostin and Sinensetin Derivatives on SUR1-Pancreatic KATP Channel Target as Antidiabetic. *Jurnal Farmasi dan Ilmu Kefarmasian Indonesia*. 8(3).
- Prayoga, A., & Rasyid, Z. 2022. Determinan Kejadian Stroke Iskemik Pasien Rawat Inap di RSUD Petala Bumi Provinsi Riau Tahun 2019. *Jurnal Kesehatan Komunitas*. 8(1): 52-58.
- Prayoga, D. K., Aulifa, D. L., Budiman, A., Levita, J., & Jiranusornkul, S. 2025. Cyanidin and Cyanidin-3-Glucoside Alleviate Peptic Ulcer Disease: Insights from In Vitro, and In Vivo Studies. *Drug Design, Development & Therapy*. 841-856.
- Purwanto, D. S., Susanti, H., & Sugihartini, N. 2021. Docking Molekuler Potensi Anti Inflamasi Quersetin Daun Kelor (*Moringa Oleifera* L.) dengan Autodock-Vina. *Jurnal Ilmiah Manusia Dan Kesehatan*. 4(2).
- Qian, R., Ye, Y., Ma, X., Gao, H., Hu, Q., & Zheng, J. 2024. Targeted Metabolome and Transcriptome Analysis Reveals the Key Metabolites and Genes

- Influencing Blue–Purple Colour Development in Clematis Lanuginosa Flowers. *Ornamental Plant Research*. 5(1).
- Rachmania, R. A., & Susilawati, D. 2022. Molecular Docking Study of Isoflavonoid Erythrina Variegata to Plasminogen Receptor as Thrombolytic Agent on Myocardial Infarction Disease. *Jurnal Jamu Indonesia*. 7(1): 12-19.
- Rahim, M. A., Umar, M., Habib, A., Imran, M., Khalid, W., Lima, C. M. G., Shoukat, A., Itrat, N., Nazir, A., Ejaz, A., Zafar, A., Awuchi, C. G., Sharma, R., Santana, R. F., & Emran, T. B. 2022. Photochemistry, Functional Properties, Food Applications, and Health Prospective of Black Rice. *Journal of Chemistry*. 2022(1): 2755084.
- Rahmawati, A., Kurniawan, D., & Damayanti, D. S. 2023. Stigmasterol Dari Biji Kacang Tungak (*Vigna Unguiculata*) Berpotensi Sebagai Penghambat Absorpsi Kolesterol Melalui Penghambatan NPC1L1 Dan Aktivasi ABCG5: Studi *In Silico*. *Jurnal Bio Komplementer Medicine*. 10(1).
- Ramadhani, A., Wahyuni, S. D., Agusfiranda, A., Elvania, E., Seftani, N., & Khairati, S. 2024. Optimalisasi Nutrisi Dalam Mendukung Pertumbuhan dan Perkembangan Anak. *Interdisiplin: Journal of Qualitative & Quantitative Research*. 1(5): 338-355.
- Reis, J. F., Monteiro, V. V. S., de Souza Gomes, R., do Carmo, M. M., da Costa, G. V., Ribera, P. C., & Monteiro, M. C. 2016. Action Mechanism and Cardiovascular Effect of Anthocyanins: A Systematic Review of Animal and Human Studies. *Journal of Translational Medicine*. 14(1): 315.
- Rocha, S., Proenca, C., Araujo, A. N., Freitas, M., Rufino, I., Aniceto, N., Silva, A. M. S., Carvalho, F., Guedes, R. C., & Fernandes, E. 2025. Flavonoids as Potential Modulators Of Pancreatic Lipase Catalytic Activity. *Pharmaceutics*. 17(2): 163.
- Rojková, T. 2021. Study Programme: Special Chemical and Biological Programmes Branch of study: Molecular Biology and Biochemistry of Organisms. *Bachelor's Thesis*. Faculty of Science. Charles University, Czech Republic.
- Safitri, S., Mappahya, A., Nurhikmawati, W., & Safitri, A. 2023. Hubungan Faktor Risiko Kejadian Hiperkolesterolemia Pasien Rawat Jalan Jantung Koroner RS Ibnu Sina Makassar. *Fakumi Med JJ Mhs Kedokt*. 3(8): 359-367.
- Sahu, R. K., & Khan, J. 2021. Formulation Strategies to Improve the Bioavailability of Poorly Absorbed Drugs. In *Advances and Challenges in Pharmaceutical Technology* (pp. 229-242). Academic Press.
- Salih, K. J. 2021. The Major Pathways of Lipids (Triglyceride and Cholesterol) and Lipoprotein Metabolism. *Zanco Journal of Pure & Applied Sciences*. 33(4): 61-72.
- Salim, H. M., Kurnia, L. F., & Bintarti, T. W. 2018. The Effects of High-Fat Diet on Histological Changes of Kidneys in Rats. *Biomolecular & Health Science Journal*. 1(2): 109-112.
- Samodelov, S. L., Kullak-Ublick, G. A., Gai, Z., & Visentin, M. 2020. Organic cation Transporters in Human Physiology, Pharmacology, and Toxicology. *International Journal of Molecular Sciences*. 21(21): 7890.

- Santamarina, A. B., Calder, P. C., Estadella, D., & Pisani, L. P. 2023. Anthocyanins Ameliorate Obesity-Associated Metainflammation: Preclinical and Clinical Evidence. *Nutrition Research*. 114: 50-70.
- Sari, D. R. T., Cairns, J. R. K., Safitri, A., & Fatchiyah, F. 2019. Virtual Prediction of the Delphinidin-3-*O*-Glucoside and Peonidin-3-*O*-Glucoside as Anti-Inflammatory of TNF- $\alpha$  Signaling. *Acta Informatica Medica*. 27(3): 152.
- Sari, I. W., Junaidin, J., & Pratiwi, D. 2020. Studi Molecular Docking Senyawa Flavonoid Herba Kumis Kucing (*Orthosiphon Stamineus* B.) pada Reseptor  $\alpha$ -Glukosidase Sebagai Antidiabetes Tipe 2. *Jurnal Farmagazine*. 7(2): 54-60.
- Semmarath, W., Mapoung, S., Umsumarng, S., Arjsri, P., Srisawad, K., Thippraphan, P., Yodkeeree, S., & Dejkriengkraikul, P. 2022. Cyanidin-3-*O*-Glucoside and Peonidin-3-*O*-Glucoside-Rich Fraction of Black Rice Germ and Bran Suppresses Inflammatory Responses from SARS-CoV-2 Spike Glycoprotein S1-Induction In Vitro in A549 Lung Cells and THP-1 Macrophages via Inhibition of the NLRP3 Inflammasome Pathway. *Nutrients*. 14(13): 2738. doi: 10.3390/nu14132738. PMID: 35807916; PMCID: PMC9268823.
- Senior, T., Botha, M. J., Kennedy, A. R., & Calvo-Castro, J. 2020. Understanding the Contribution of Individual Amino Acid Residues in the Binding of Psychoactive Substances to Monoamine Transporters. *ACS Omega*. 5(28): 17223-17231.
- Setiyabudi, L., Ulya, N. F., Indratmoko, S., & Swandari, M. T. K. 2022. In-Silico Analysis of Maricaffeoylide from *Avicennia Marina* Using Molecular Docking with Tumor Necrosis Factor Receptor. *Biomedical Journal of Indonesia*. 8(1): 20–24. <https://doi.org/10.32539/BJI.v8i1.141>
- Seyedan, A., Alshawsh, M. A., Alshagga, M. A., Koosha, S., & Mohamed, Z. 2015. Medicinal Plants and Their Inhibitory Activities Against Pancreatic Lipase: A Review. *Evidence-Based Complementary & Alternative Medicine*. 2015(1): 973143.
- Shamarao, N., & Chethankumar, M. 2022. Antiobesity Drug-Likeness Properties and Pancreatic Lipase Inhibition of a Novel Low Molecular Weight Lutein Oxidized Product, LOP6. *Food Funct*. 13(11):6036–6055.
- Shammugasamy, B., Ramakrishnan, Y., Ghazali, H. M., & Muhammad, K. 2015. Tocopherol and Tocotrienol Contents of Different Varieties of Rice in Malaysia. *J Sci Food Agric*. 95(4): 672-678. <https://doi.org/10.1002/jsfa.6742>.
- Siddiqui, S. A., Azmy Harahap, I., Suthar, P., Wu, Y. S., Ghosh, N., & Castro-Muñoz, R. 2023. A Comprehensive Review of Phytonutrients as a Dietary Therapy for Obesity. *Foods*. 12(19): 3610.
- SKI. 2023. *Survei Kesehatan Indonesia (SKI) Tahun 2023 Dalam Angka*. Jakarta: Kementerian Kesehatan Republik Indonesia.
- Song, H., Shen, X., Zhou, Y., & Zheng, X. 2021. Black Rice Anthocyanins Alleviate Hyperlipidemia, Liver Steatosis and Insulin Resistance by Regulating Lipid Metabolism and Gut Microbiota in Obese Mice. *Food & Function*. 12(20): 10160-10170.

- Sood, R., Sanjay, Kang, S. U., Yoon, N. Y., & Lee, H. J. 2024. Malvidin-3-O-Glucoside Mitigates  $\alpha$ -Syn and MPTP Co-Induced Oxidative Stress and Apoptosis in Human Microglial HMC3 Cells. *International Journal of Molecular Sciences*. 25(23): 12733.
- 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.
- Sugiarti, E. I., & Meikawati, W. 2018. Hubungan Aktivitas Fisik Dan Status Obesitas Dengan Kadar Kolesterol Dan Kadar Asam Urat Pada Pegawai Puskesmas Gubug 1 Kabupaten Grobogan. *Skripsi*. Fakultas Ilmu Keperawatan dan Kesehatan, Univ. Muhammadiyah Semarang, Semarang.
- Sun, B., Li, F., Zhang, X., Wang, W., Shao, J., & Zheng, Y. 2022. Delphinidin-3-O-Glucoside, an Active Compound of Hibiscus Sabdariffa Calyces, Inhibits Oxidative Stress and Inflammation in Rabbits with Atherosclerosis. *Pharmaceutical Biology*. 60(1): 247-254.
- Sun, J., Li, X., Luo, H., Ding, L., Jiang, X., Li, X., Jiao, R., & Bai, W. 2020. Comparative Study on the Stability and Antioxidant Activity of Six Pyranoanthocyanins Based on Malvidin-3-Glucoside. *Journal of Agricultural & Food Chemistry*. 68(9): 2783-2794.
- Sun, Y., Zhu, B., Cong, P., Li, X., Liu, L., Guo, C., Zhao, K., Qiu, J., Ji, H., Zhu, X., & Kouame, K. J. E.-P. 2024. Regulating Fat Globule Structure of Infant Formula Based on MFGM to Promote Lipid Uptake by Improving Lipolysis. *Food Hydrocolloids*. 155: 110167.
- Sundalian, M., Adnan, K., Yusuf, M., & Astriany, D. 2020. Molecular Docking of Xanthone Compounds of Mangosteen Fruits Peel (*Garcinia Mangostana* L.) as Beta-OG Pocket Binding Inhibitor in Dengue Virus Envelope. In 2nd Bakti Tunas Husada-Health Science International Conference (BTH-HSIC 2019). *Atlantis Press*. 26: 81-87.
- Susilowati, E., & Susanti, E. 2025. Hubungan Indeks Masa Tubuh (IMT) Dengan Kadar Kolesterol Total Pada Komunitas Masyarakat Di Kota Malang. *Pharmademica: Jurnal Kefarmasian Dan Gizi*. 5(1): 107-115.
- Swapna, K., Srujana, M., & Mamidala, E. 2024. *In Silico* Toxicity Evaluation Of Novel Compounds Isolated From *Withania Somnifera*. *Cahiers Magellanes-NS*. 6(2): 2076-2083.
- Tan, J., Li, Y., Hou, D. X., & Wu, S. 2019. The Effects and Mechanisms of Cyanidin-3-Glucoside and Its Phenolic Metabolites in Maintaining Intestinal Integrity. *Antioxidants*. 8(10): 479.
- Thangasparan, S., Kamisah, Y., Ugusman, A., Mohamad Anuar, N. N., & Ibrahim, N. I. 2024. Unravelling the Mechanisms of Oxidised Low-Density Lipoprotein in Cardiovascular Health: Current Evidence from In Vitro and In Vivo Studies. *International Journal of Molecular Sciences*. 25(24): 13292.

- Thanuja, B., & Parimalavalli, R. 2018. Role of Black Rice in Health and Diseases. *Internasional Journal of Health Science & Research*. 8: 241-248.
- Tokgozoglu, L., & Kayikcioglu, M. 2021. Familial Hypercholesterolemia: Global Burden and Approaches. *Current Cardiology Reports*. 23(151): 1-13.
- Tripathi, A., & Misra, K. 2017. Molecular Docking: A Structure-Based Drug Designing Approach. *JSM Chem*. 5(2): 1042-1047.
- Truzzi, F., Tibaldi, C., Zhang, Y., Dinelli, G., & D' Amen, E. 2021. An Overview on Dietary Polyphenols and Their Biopharmaceutical Classification System (Bcs). *International Journal of Molecular Sciences*. 22(11): 5514.
- Uivarasan, A., Lukinac, J., Jukić, M., Šelo, G., Peter, A., Nicula, C., Mihaly Cozmuta, A., & Mihaly Cozmuta, L. 2024. Characterization of Polyphenol Composition and Starch and Protein Structure in Brown Rice Flour, Black Rice Flour and Their Mixtures. *Foods*. 13(11): 1592.
- Upadhyaya, S. R., Bashyal, J., Raut, B. K., & Parajuli, N. 2025. In Silico Study Of Therapeutic Potential Of Natural Polyphenol Derivatives Targeting Pancreatic Lipase. *Discover Chemistry*. 2(1): 189.
- Vardhani, A. F. I. F. A. H., Jufri, M. A. H. D. I., & Purwaningsih, E. R. N. I. 2020. Potency of  $\gamma$ -Oryzanol Rich Black Rice Bran (*Oryza sativa L. Indica*) Extract for Tyrosinase Inhibition. *Int J Pharm Pharm Sci*. 12(5): 90-93.
- Venkatesh, P., & Kasi, A. 2025. *Pancrelipase Therapy*. In StatPearls: StatPearls Publishing. <https://www.ncbi.nlm.nih.gov/books/NBK534816/>
- Verma, C., Quraishi, M. A., & Rhee, K. Y. 2022. Natural Ligands: Promising Ecofriendly Alternatives for Corrosion Protection and Plethora of Many Prospects. *Process Safety & Environmental Protection*. 162: 253-290.
- Vo, C. V. T., Luu, N. V., Nguyen, T. T., Nguyen, T. T., Ho, B. Q., Nguyen, T. H., Nguyeng, T. T., Ho, B. Q., Nguyen, T. H., Tran T. D., & Nguyen, Q. T. 2022. Screening For Pancreatic Lipase Inhibitors: Evaluating Assay Conditions Using P-Nitrophenyl Palmitate as Substrate. *All Life*. 15(1): 13-22.
- Vo, T. T. T., Peng, T. Y., Nguyen, T. H., Bui, T. N. H., Wang, C. S., Lee, W. J., Chen, Y. H., & Lee, I. T. 2024. The Crosstalk Between Copper-Induced Oxidative Stress and Cuproptosis: A Novel Potential Anticancer Paradigm. *Cell Communication & Signaling*. 22(1): 353.
- Wang, H. H., Garruti, G., Liu, M., Portincasa, P., & Wang, D. Q. 2018. Cholesterol And Lipoprotein Metabolism and Atherosclerosis: Recent Advances in Reverse Cholesterol Transport. *Annals Of Hepatology*. 16(1): 27-42.
- Wang, P., Song, X., & Liang, Q. 2025. Molecular Docking Studies and In Vitro Activity of Pancreatic Lipase Inhibitors from Yak Milk Cheese. *International Journal of Molecular Sciences*. 26(2): 756.
- Wardawati, Sulaiman, Y., Suharmi, S., Sebba, A. K., Zulkifli, Z., Dina, D., Rifai, A., Alawiyah, T., Asmuni, A., Haerani, H., Putri, S. A., Wulandari, E., & Sastrariah, S. 2022. *Dasar-Dasar Ilmu Gizi*. Yayasan Penerbit Muhammad Zaini: Aceh.

- Wresdiyati, T., Rizaldi, D. A., & Purnawan, T. 2023. Hypercholesterolemia and Its Management Using Various Bioactive Compounds: A Literature Review. *Jurnal Veteriner*. 24(3).
- Xiao, J., Dong, L. W., Liu, S., Meng, F. H., Xie, C., Lu, X. Y., Zhang, W. J., Luo, J., & Song, B. L. Bile Acids-Mediated Intracellular Cholesterol Transport Promotes Intestinal Cholesterol Absorption And NPC1L1 Recycling. *Nature Communications*, 14(1): 6469.
- Xiao, Y., Nie, M., Zhao, H., Li, D., Gao, R., Zhou, C., Xu, Y., Dai, Z., & Zhang, Z. Citrus Flavanones Enhance The Bioaccessibility Of  $\beta$ -Carotene By Improving Lipid Lipolysis And Incorporation Into Mixed Micelles. *Journal Of Functional Foods*, 87, 104792.
- Xie, B., Wang, M., & Yang, D. 2024. Identification of Anthocyanins in Deep Colored Berries and Grains in China. *Food Chemistry: X*. 23: 101602.
- Xu, C., Fu, F., She, Y., & Xu, C. NPC1L1 Plays A Novel Role In Nonalcoholic Fatty Liver Disease. *ACS Omega*, 8(51): 48586-48589.
- Xu, Y., Hu, D., Li, Y., Sun, C., & Chen, W. 2018. An Effective Method for Preparation of High-Purity Pelargonidin-3-*O*-Glucoside from Strawberry and Its Protective Effect on Cellular Oxidative Stress. *Journal of Chromatography B*. 1072: 211-220.
- Xu, Y., Li, Y., Xie, J., Xie, L., Mo, J., & Chen, W. 2021. Bioavailability, Absorption, and Metabolism of Pelargonidin-Based Anthocyanins Using Sprague–Dawley Rats and Caco-2 Cell Monolayers. *Journal of Agricultural and Food Chemistry*. 69(28): 7841-7850.
- Yanda, W. 2020. Respon Pemberian Pupuk Organik Cair Keong Mas dan Biochar Kendaga Biji Karet Terhadap Peningkatan Produksi Tanaman Padi Hitam (*Oriza Sativa L.*). *Skripsi*. Fakultas Pertanian, Univ. Medan Area, Medan.
- Yao, S. L., Xu, Y., Zhang, Y. Y., & Lu, Y. H. 2013. Black Rice and Anthocyanins Induce Inhibition of Cholesterol Absorption *In Vitro*. *Food & Function*. 4(11).
- Ye, A., Roy, D., & Singh, H. 2020. Structural Changes to Milk Protein Products during Gastrointestinal Digestion. *Milk Proteins*. 671-700.
- Yuan, T., Wang, L., Chen, L., Zhong, J., Lin, Y., Wang, Y., Lin, C., & Fan, H. (2024). Combinatorial Preparation and Structural Characterization of Anthocyanins and Aglycones from Purple-Heart Radish for Evaluation of Physicochemical Stability and Pancreatic Lipase Inhibitory Activity. *Food Chemistry*. 446: 138832.
- Zang, X., Zhu, Y., Song, F., Yao, Y., Ya, F., Li, D., Ling, W., & Yang, Y. 2016. Effects of Purified Anthocyanin Supplementation on Platelet Chemokines in Hypocholesterolemic Individuals: A Randomized Controlled Trial. *Nutrition & Metabolism*. 13(1): 1-12.
- Zeki, N. M., & Mustafa, Y. F. 2024. Digital Alchemy: Exploring the Pharmacokinetic and Toxicity Profiles of Selected Coumarin-Heterocycle Hybrids. *Results in Chemistry*. 10: 101754.
- Zhang, B., Kuipers, F., de Boer, J. F., & Kuivenhoven, J. A. 2021. Modulation of Bile Acid Metabolism to Improve Plasma Lipid and Lipoprotein Profiles. *Journal of Clinical Medicine*. 11(1): 4.

- Zhang, S., Li, X., Ai, B., Zheng, L., Zheng, X., Yang, Y., Xiao, D., & Sheng, Z. 2022. Binding of  $\beta$ -Lactoglobulin to Three Phenolics Improves the Stability of Phenolics Studied by Multispectral Analysis and Molecular Modeling. *Food Chemistry*: X. 15: 100369. <https://doi.org/10.1016/j.fochx.2022.100369>.
- Zhang, S., Ma, Q., Dong, L., Jia, X., Liu, L., Huang, F., Liu, G., Sun, Z., Chi, J., Zhang, M., & Zhang, R. 2022. Phenolic Profiles and Bioactivities of Different Milling Fractions of Rice Bran from Black Rice. *Food Chemistry*. 378: 132035.
- Zhang, X., Xia, M., Zhao, J., Cao, Z., Zou, W., & Zhou, Q. 2022. Photoaging Enhanced the Adverse Effects of Polyamide Microplastics on the Growth, Intestinal Health, and Lipid Absorption in Developing Zebrafish. *Environment International*. 158: 106922.
- Zhang, Y., Luo, X. A., Zhu, L. J., Wang, S. Z., Jia, M. Q., & Chen, Z. X. 2019. Catalytic Behavior of Pancreatic Lipase in Crowded Medium for Hydrolysis of Medium-Chain and Long-Chain Lipid: An Isothermal Titration Calorimetry Study. *Thermochimica Acta*. 672: 70-78.
- Zhou, Q., Zhou, J., Liu, X., Zhang, Y. B., & Cai, S. 2020. Digestive Enzyme Inhibition Of Different Phenolic Fractions And Main Phenolic Compounds Of Ultra-High-Pressure-Treated Palm Fruits: Interaction And Molecular Docking Analyses. *Journal of Food Quality*. 2020(1): 8811597.
- Zulfamidah, Z., Abdullah, R. P. I., & Fajriansyah, F. 2022. Pkm Sosialisasi Bahaya Hiperkolesterolemia pada Tubuh dan Pemeriksaan Kadar Kolesterol di Desa Paddingin Kabupaten Takalar. *Jurnal Pengabdian Kedokteran Indonesia*. 3(1): 14-20.