

DAFTAR PUSTAKA

- Aksoz, B.E. and Ertan, R., 2012, Spectral Properties of Chalcones II Begüm, *Fabad J.Pharm*, 37, 205–216.
- Algul, O., Kaessler, A., Apcin, Y., Yilmaz, A., and Jose, J., 2008, Comparative studies on conventional and microwave synthesis of some benzimidazole, benzothiazole and indole derivatives and testing on inhibition of hyaluronidase, *Molecules*, 13, 736–748.
- Alsanosi, S.M.M., Skiffington, C., and Padmanabhan, S., 2014, Pharmacokinetic Pharmacogenomics, *Handbook of Pharmacogenomics and Stratified Medicine*. Elsevier Inc., UK, 341–364.
- Amaro, R.E. and Mulholland, A.J., 2018, Multiscale methods in drug design complexity in the search for cures, *Nat. Rev. Chem.*, 2, 0148.
- Anonim, 2021, *World Malaria Report*, World Health Organization, Luxembourg.
- Aykul, S. and Martinez-Hackert, E., 2016, Determination of half-maximal inhibitory concentration using biosensor-based protein interaction analysis, *Anal. Biochem.*, 508, 97–103.
- Basco, L.K., Mitaku, S., Skaltsounis, A.L., Ravelomanantsoa, N., Tillequin, F., Koch, M., and Le Bras, J., 1994, In vitro activities of furoquinoline and acridone alkaloids against Plasmodium falciparum, *Antimicrob. Agents Chemother.*, 38, 1169–1171.
- Batagin-Neto, A. and Lavarda, F.C., 2014, The correlation between electronic structure and antimalarial activity of alkoxyated and hydroxylated chalcones, *Med. Chem. Res.*, 23, 580–586.
- Batista, R., De Jesus Silva Júnior, A., and De Oliveira, A.B., 2009, Plant-derived antimalarial agents: New leads and efficient phytomedicines. part II. non-alkaloidal natural products, *Molecules*, 14, 3037–3072.
- Bhuiyan, M.M.H., Hossain, M.I., Mahmud, M.M., and Al-Amin, M., 2011, Microwave-assisted Efficient Synthesis of Chalcones as Probes for Antimicrobial Activities, *Chem. J.*, 01, 21–28.
- Burmaoglu, S., Kazancioglu, E.A., Kaya, R., Kazancioglu, M., Karaman, M., Algul, O., and Gulcin, I., 2020, Synthesis of novel organohalogen chalcone derivatives and screening of their molecular docking study and some enzymes inhibition effects, *J. Mol. Struct.*, 1208, 1–15.

- Cahayani, M., Rahmadani, A., Rahmawati, D., and Rusli, R., 2018, Sintesis dan uji toksisitas senyawa 2',4'-Dikloro-4-metoksikalkon, *J. Ilm. Manuntung*, 4, 84–88.
- Chaijaroenkul, W., Ward, S.A., Mungthin, M., Johnson, D., Owen, A., Bray, P.G., and Na-bangchang, K., 2011, Sequence and gene expression of chloroquine resistance transporter (PfCRT) in the association of in vitro drugs resistance of Plasmodium falciparum, *Malar. J.*, 10, 1–9.
- Chaniad, P., Mungthin, M., Payaka, A., Viriyavejakul, P., and Punsawad, C., 2021, Antimalarial properties and molecular docking analysis of compounds from Dioscorea bulbifera L. as new antimalarial agent candidates, *BMC Complement. Med. Ther.*, 21, 1–10.
- Cheng, F., Li, W., Zhou, Y., Shen, J., Wu, Z., Liu, G., Lee, P.W., and Tang, Y., 2012, AdmetSAR: A comprehensive source and free tool for assessment of chemical ADMET properties, *J. Chem. Inf. Model.*, 52, 3099–3105.
- Dambuza, N.S., Smith, P., Evans, A., Norman, J., Taylor, D., Andayi, A., Egan, T., Chibale, K., and Wiesner, L., 2015, Antiplasmodial activity, in vivo pharmacokinetics and anti-malarial efficacy evaluation of hydroxypyridinone hybrids in a mouse model, *Malar. J.*, 14, 1–8.
- Deodhar, M., Al Rihani, S.B., Arwood, M.J., Darakjian, L., Dow, P., Turgeon, J., and Michaud, V., 2020, Mechanisms of cyp450 inhibition: Understanding drug-drug interactions due to mechanism-based inhibition in clinical practice, *Pharmaceutics*, 12, 1–18.
- Dimi, B., Adam, A., and Alim, A., 2020, Prevalensi Malaria, *J. Ilm. Kesehatan*, 19, 4–9.
- Du, X., Li, Y., Xia, Y., Ai, S., Liang, J., Sang, P., and Ji, X., 2016, Insights into Protein – Ligand Interactions : Mechanisms , Models , and Methods, *Int. J. Mol. Sci.*, 17, 1–34.
- Ekoue-kovi, K., Yearick, K., Iwaniuk, D.P., Natarajan, J.K., Dios, A.C. De, Roepe, P.D., and Wolf, C., 2009, NIH Public Access, *Bioorg Med Chem.*, 17, 270–283.
- Erhirhie, E.O., Ihekwereme, C.P., and Ilodigwe, E.E., 2018, Advances in acute toxicity testing: Strengths, weaknesses and regulatory acceptance, *Interdiscip. Toxicol.*, 11, 5–12.
- Ester, M., 2020, Sintesis dan uji aktivitas antimalaria senyawa turunan kalkon dari 2-Kloroasetofenon dan turunan benzaldehida, *Skripsi*. Jurusan Kimia FMIPA UGM, Yogyakarta.
- Fatunde, O.A. and Brown, S.A., 2020, The role of CYP450 drug metabolism in precision Cardio-Oncology, *Int. J. Mol. Sci.*, 21, 1–26.

- Fidock, D.A., Nomura, T., Talley, A.K., Cooper, R.A., Dzekunov, S.M., Ferdig, M.T., Ursos, L.M.B., Sidhu, S., Deitsch, K.W., Su, X., Wootton, J.C., Roepe, P.D., and Wellems, T.E., 2000, Mutations in the P. falciparum Digestive Vacuole Transmembrane Protein PfCRT and Evidence for Their Role in Chloroquine Resistance, *6*, 861–871.
- Fu, Y., Liu, D., Zeng, H., Ren, X., Song, B., Hu, D., and Gan, X., 2020, New chalcone derivatives: Synthesis, antiviral activity and mechanism of action, *RSC Adv.*, *10*, 24483–24490.
- Gaikwad, K. V., Gaikwad, S. V., Jadhav, S.B., and Rathod, S.D., 2010, Synthesis of some novel chalcones of phthalimidoester possessing good antiinflammatory and antimicrobial activity, *Indian J. Chem.*, *49*, 131–136.
- Hapsari, M., Windarti, T., Purbowatiningrum, Ngadiwiyana, and Ismiyanto, 2018, Synthesis of 4-hydroxy-3-methylchalcone from Reimer-Tiemann reaction product and its antibacterial activity test, *IOP Conf. Ser. Mater. Sci. Eng.*, *349*, 1–7.
- Huang, S.Y. and Zou, X., 2010, Advances and challenges in Protein-ligand docking, *Int. J. Mol. Sci.*, *11*, 3016–3034.
- Hughes, J.P., Rees, S.S., Kalindjian, S.B., and Philpott, K.L., 2011, Principles of early drug discovery, *Br. J. Pharmacol.*, *162*, 1239–1249.
- Ighilahriz, K., Boutemur, B., Chami, F., Rabia, C., Hamdi, M., and Hamdi, S.M., 2008, A microwave-assisted and heteropolyacids-catalysed cyclocondensation reaction for the synthesis of 4(3H)-quinazolinones, *Molecules*, *13*, 779–789.
- Jayapal, M.R., Prasad, K.S., and Sreedhar, N.Y., 2010, Synthesis and characterization of 2,4-dihydroxy substituted chalcones using aldol condensation by SOCl₂/EtOH, *J. Chem. Pharm. Res*, *2*, 127–132.
- Kappe, C.O., 2004, Controlled microwave heating in modern organic synthesis, *Angew. Chemie*, *43*, 6250–6284.
- Kategaonkar, A., Shelke, K.F., Sadaphal, S., and Shingate, B., 2009, Microwave assisted synthesis of pyrimido [4, 5-d] pyrimidine derivatives in dry media, *Ukr. Bioorganica Acta*, *1*, 3–7.
- Kim, J., Tan, Y.Z., Wicht, K.J., Erramilli, S.K., Dhingra, S.K., Okombo, J., Vendome, J., Hagenah, L.M., Giacometti, S.I., Warren, A.L., Nosol, K., Roepe, P.D., Potter, C.S., Carragher, B., Kossiakoff, A.A., Quick, M., Fidock, D.A., and Mancina, F., 2019, Structure and Drug Resistance of the Plasmodium falciparum Transporter PfCRT, *Nature*, *576*, 315–320.
- Kumar, G., Parasuraman, P., Sharma, S.K., Banerjee, T., Karmodiya, K., Surolia, N., and Surolia, A., 2007, Discovery of a rhodanine class of compounds as inhibitors of Plasmodium falciparum enoyl-acyl carrier protein reductase, *J.*

Med. Chem., 50, 2665–2675.

- Kumar, R., Mohanakrishnan, D., Sharma, A., Kumar, N., and Kalia, K., 2010, Reinvestigation of structure e activity relationship of methoxylated chalcones as antimalarials : Synthesis and evaluation of 2 , 4 , 5-trimethoxy substituted patterns as lead candidates derived from abundantly available natural b - asarone, *Eur. J. Med. Chem.*, 45, 5292–5301.
- Kusumaningdyah, A.R., 2010, Sintesis 4-(4-asetoksi-fenil)-3-buten-2-on dengan metode Microwave-Assisted Organic Synthesis (MAOS), *Skripsi*. Jurusan Kimia FMIPA UGM, Yogyakarta.
- Lahsasni, S.A., Hamad, F., Korbi, A., and Aljaber, N.A., 2014, Synthesis , characterization and evaluation of antioxidant activities of some novel chalcones analogues, *Chem. Cent. Journa*, 8, 1–10.
- Larhed, M. and Hallberg, A., 2001, chemistry : a new technique in drug discovery, *Reasearch Focus Rev*, 6, 406–416.
- Li, K., Zhao, S., Long, J., Su, J., Wu, L., Tao, J., Zhou, J., Zhang, J., Chen, X., and Peng, C., 2020, A novel chalcone derivative has antitumor activity in melanoma by inducing DNA damage through the upregulation of ROS products, *Cancer Cell Int.*, 20, 1–17.
- Li, R., Kenyon, G.L., Cohen, F.E., Chen, X., Gong, B., Dominguez, J.N., Davidson, E., Kurzban, G., Edwin, E.M., Rosenthal, P.J., and Mckerrowisa, J.H., 1995, In Vitro Antimalarial Activity of Chalcones and Their Derivatives, *J. Med. Chem.*, 38, 5031–5037.
- Lim, S.S., Kimj, H., and Lee, D., 2007, In vitro Antimalarial Activity of Flavonoids and Chaicones, *Bull. Korean Chem. Soc.*, 28, 2495–2497.
- Lindert, S. and McCammon, J.A., 2012, Dynamic of Plasmodium falciparum enoyl-ACP reductase and implications on drug discoveryf, *Protein Sci.*, 21, 1734–1745.
- Lipinski, C.A., Lombardo, F., Dominy, B.W., and Feeney, P.J., 2001, Experimental and computational approaches to estimate solubility and permeability in drug discovery and development settings, *Adv. Drug Deliv. Rev.*, 46, 3–26.
- Lusrianti, Balatif, N., and Zamri, A., 2015, Sintesis dan Uji Toksisitas Senyawa Analog Kalkon dari 4'-Hidroksiasetofenon dengan dimetoksibenzaldehid, *J. Phot.*, 6, 45–49.
- Mahapatra, D.K., Bharti, S.K., and Asati, V., 2015, Anti-cancer chalcones : Structural and molecular target perspectives, *Eur. J. Med. Chem.*, 98, 69–114.
- Malau, N.D. and Azzahra, S.F., 2020, Analysis Docking Of Plasmodium Falciparum Enoyl Acyl Carrier Protein Reductase (Pfenr) With Organic

- Compunds From Virtual Screening Of Herbal Database, *Acta Chim. Asiana*, 3, 127–134.
- Manar, F.G., 2021, Sintesis turunan kalkon dengan bahan dasar kloroasetofenon dan uji aktivitasnya sebagai antikanker, *Skripsi*. Jurusan Kimia FMIPA UGM, Yogyakarta.
- Morris, G.M. and Lim-wilby, M., 2008, Molecular Docking: Methods in Molecular Biology, . Kukol, A. (ed), *Molecular Modeling of Proteins*. Humana Press, New Jersey, AS, pp. 365–382.
- Mourad, A.F.E., Aly, A.A., Farag, H.H., and Beshr, E.A., 2007, Microwave assisted synthesis of triazoloquinazolinones and benzimidazoquinazolinones, *Beilstein J. Org. Chem.*, 3, 3–7.
- Murthihapsari; and Chasanah, E., 2010, Potensi penemuan obat antimalaria baru dari laut indonesia, *Squalen*, 5, 86–91.
- Mustafa, M. and Mostafa, Y.A., 2020, A facile synthesis, drug-likeness, and in silico molecular docking of certain new azidosulfonamide–chalcones and their in vitro antimicrobial activity, *Monatshefte fur Chemie*, 151, 417–427.
- Muttaqin, S.S. and Maji, J.S., 2018, Screening of Oxamic Acid Similar 3D Structures as Candidate Inhibitor Plasmodium falciparum L-Lactate Dehydrogenase of Malaria Through Molecular Docking, *1st Int. Conf. Bioinformatics, Biotechnol. Biomed. Eng. BioMIC 2018*, 1, 1–6.
- Ni, L., Meng, C.Q., and Sikorski, J.A., 2004, Recent advances in therapeutic chalcone, *Expert Opin. Ther. Patents*, 14, 1669–1691.
- Nusantoro, Y.R. and Fadlan, A., 2020, Analisis Sifat Mirip Obat, Prediksi ADMET, dan Penambatan Molekular Isatinil-2-Aminobenzoilhidrazon dan kompleks logam transisi Co(II), Ni(II), Cu(II), Zn(II) Terhadap BCL2-XL, *Akta Kim. Indones.*, 5, 114–126.
- Nzila, A. and Mwai, L., 2009, In vitro selection of Plasmodium falciparum drug-resistant parasite lines, *J. Antimicrob. Chemother.*, 65, 390–398.
- Pagadala, N.S., Syed, K., and Tuszynski, J., 2017, Software for molecular docking : a review, *Biophys. Rev.*, 3, 91–102.
- Pannu, A.K., 2019, Malaria today: advances in management and control, *Trop. Doct.*, 49, 160–164.
- Penna-Coutinho, J., Cortopassi, W.A., Oliveira, A.A., França, T.C.C., and Krettli, A.U., 2011, Antimalarial activity of potential inhibitors of Plasmodium falciparum lactate dehydrogenase enzyme selected by docking studies, *PLoS One*, 6, 1–7.
- Pérez, M.A.C., Sanz, M.B., Torres, L.R., Évalos, R.G., González, M.P., and Díaz,

- H.G., 2004, A topological sub-structural approach for predicting human intestinal absorption of drugs, *Eur. J. Med. Chem.*, 39, 905–916.
- Perez, S. and Tvaroska, I., 2014, Carbohydrate – Protein Interactions: Molecular Modeling Insights, *Adv. Carbohydr. Chem. Biochem.*, 71, 12–110.
- Perozzo, R., Kuo, M., Sidhu, A.B.S., Valiyaveetil, J.T., Bittman, R., Jacobs, W.R., Fidock, D.A., and Sacchettini, J.C., 2002, Structural elucidation of the specificity of the antibacterial agent triclosan for malarial enoyl acyl carrier protein reductase, *J. Biol. Chem.*, 277, 13106–13114.
- Pires, D.E., Blundell, T.L., and Ascher, D.B., 2015, pkCSM : predicting small-molecule pharmacokinetic properties using graph-based signatures, *J. Med. Chem.*, 9, 4066–4072.
- Pranowo, D., Suputa, S., and Wahyuningsih, T.D., 2010, Synthesis of 4-(3,4-Dimethoxy-Phenyl)-3-Butene-2-on and Activity It'S Test As a Fruit Flies Atractant, *Indones. J. Chem.*, 6, 99–103.
- Read, J.A., Wilkinson, K.W., Tranter, R., Sessions, R.B., and Brady, R.L., 1999, Chloroquine binds in the cofactor binding site of Plasmodium falciparum lactate dehydrogenase, *J. Biol. Chem.*, 274, 10213–10218.
- Rosenthal, P.J., 2003, Antimalarial drug discovery: old and new approaches, *J. Exp. Biol.*, 206, 3735–3744.
- Sahu, N.K., S. Balbhadra, S., Choudhary, J., and V. Kohli, D., 2012, Exploring Pharmacological Significance of Chalcone Scaffold: A Review, *Curr. Med. Chem.*, 19, 209–225.
- Salas, P.F., Herrmann, C., Cawthray, J.F., Nimphius, C., Kenkel, A., Chen, J., Kock, C. De, Smith, P.J., Patrick, B.O., Adam, M.J., and Orvig, C., 2012, Structural Characteristics of Chloroquine-Bridged Ferrocenophane Analogues of Ferroquine May Obviate Malaria Drug-Resistance Mechanisms, *J. Med. Chem.*, 1–18.
- Shibeshi, M.A., Kifle, Z.D., and Atnafie, S.A., 2020, Antimalarial Drug Resistance and Novel Targets for Antimalarial Drug Discovery, 4047–4060.
- Shofi, M., 2022, Uji In Silico Aktivitas Sitotoksik Dan Toksisitas Senyawa Bioaktif Biji Trembesi (Samanea saman (jacq.) Merr) sebagai Kandidat Obat Diabetes Mellitus, *J. Pharma Bhakta*, 1, 1–14.
- Sinha, S., Batovska, D.I., Medhi, B., Radotra, B.D., Bhalla, A., Markova, N., and Sehgal, R., 2019, In vitro anti-malarial efficacy of chalcones: Cytotoxicity profile, mechanism of action and their effect on erythrocytes, *Malar. J.*, 18, 1–11.
- Sivakumar, P.M., Prabhakar, P.K., and Doble, M., 2011, Synthesis, antioxidant

evaluation, and quantitative structure-activity relationship studies of chalcones, *Med. Chem. Res.*, 20, 482–492.

Sleder, A.T., Kalus, J., and Lanfear, D.E., 2016, Cardiovascular Pharmacokinetics, Pharmacodynamics, and Pharmacogenomics for the Clinical Practitioner, *J. Cardiovasc. Pharmacol. Ther.*, 21, 20–26.

Sohilait, M.R., Dwi Pranowo, H., and Haryadi, W., 2017, Molecular docking analysis of curcumin analogues with COX-2, *Biomed. Informatics*, 13, 356–359.

Stanzione, F., Giangreco, I., and Cole, J.C., 2021, Use of molecular docking computational tools in drug discovery, *Progress in Medicinal Chemistry*. Elsevier B.V., Cambridge, UK, pp. 273–343.

Suma, A.A., Wahyuningsih, T.D., and Mustofa, 2019, Efficient Synthesis of Chloro Chalcones Under Ultrasound Irradiation, their Anticancer Activities and Molecular Docking Studies, *Rasayan J. Chem.*, 12, 502–510.

Susanti VH, E., Matsjeh, S., Mustofa, Redjeki, T., and Wahyuningsih, T.D., 2014, Syntheses and antioxidant activities of some hydroxy dimethoxy chalcone derivatives, *Indones. J. Pharm*, 25, 17–24.

Syahri, J., Yuanita, E., Nurohmah, B.A., Armunanto, R., and Purwono, B., 2017, Chalcone analogue as potent anti-malarial compounds against Plasmodium falciparum: Synthesis, biological evaluation, and docking simulation study, *Asian Pac. J. Trop. Biomed.*, 7, 675–679.

Syam, S., Abdelwahab, S.I., Al-Mamary, M.A., and Mohan, S., 2012, Synthesis of chalcones with anticancer activities, *Molecules*, 17, 6179–6195.

Talapko, J., Ivana, Š., Tamara, A., Juki, M., and V., A., 2019, Review Malaria : The Past and the Present, *Microorganisms*, 7, 1–17.

Tang, Y.L., Zheng, X., Qi, Y., Pu, X.J., Liu, B., Zhang, X., Li, X.S., Xiao, W.L., Wan, C.P., and Mao, Z.W., 2020, Synthesis and anti-inflammatory evaluation of new chalcone derivatives bearing bispiperazine linker as IL-1 β inhibitors, *Bioorg. Chem.*, 98, 103748.

Taylor, R.D., Jewsbury, P.J., and Essex, J.W., 2002, A review of protein-small molecule docking methods, *J. Comput. Aided. Mol. Des.*, 16, 151–166.

Tharwat, A., Moemen, Y.S., and Hassanien, A.E., 2017, Classification of toxicity effects of biotransformed hepatic drugs using whale optimized support vector machines, *J. Biomed. Inform.*, 68, 132–149.

Thirunarayanan, G., Mayavel, P., and Thirumurthy, K., 2012, Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy Fly-ash: H₂SO₄ catalyzed solvent free efficient synthesis of some aryl chalcones under

- microwave irradiation, *Spectrochim. Acta Part A Mol. Biomol. Spectrosc.*, 91, 18–22.
- Thu, A.M., Phyo, A.P., Landier, J., and Parker, D.M., 2017, Combating multi-drug resistant Plasmodium falciparum malaria, *FEBS J*, 284, 2569–2578.
- Vela'zquez-Libera, J.L., Dura'n-Verdugo, F., Valde's-Jime'nez, A., ~nez-Vivanco, G.N., and Caballero, J., 2020, Structural bioinformatics LigRMSD: a web server for automatic structure matching and RMSD calculations among identical and similar compounds in protein-ligand docking, *Bioinformatics*, 36, 2912–2914.
- Vyas, V.K., Bhati, S., Patel, S., and Ghate, M., 2021, Structure- and ligand-based drug design methods for the modeling of antimalarial agents: a review of updates from 2012 onwards, *J. Biomol. Struct. Dyn.*, 40, 10481–10506.
- Wang, D. and Wang, M., 2013, Anion– π Interactions: Generality, Binding Strength, and Structure, *J. Am. Chem. Soc.*, 135, 892–897.
- Wati, W., Widodo, G.P., and Herowati, R., 2020, Prediction of Pharmacokinetics Parameter and Molecular Docking Study of Antidiabetic Compounds from Syzygium polyanthum and Syzygium cumini, *J. Kim. Sains dan Apl.*, 23, 189–195.
- Wellems, T.E. and Plowe, C. V., 2001, Chloroquine-resistant malaria, *J. Infect. Dis.*, 184, 770–776.
- Xiong, G., Wu, Z., Yi, J., Fu, L., Yang, Z., Hsieh, C., Yin, M., Zeng, X., Wu, C., Lu, A., Chen, X., Hou, T., and Cao, D., 2021, ADMETlab 2.0: An integrated online platform for accurate and comprehensive predictions of ADMET properties, *Nucleic Acids Res.*, 49, 5–14.
- Yadav, N., Dixit, S.K., Bhattacharya, A., Mishra, L.C., Sharma, M., Awasthi, S.K., and Bhasin, V.K., 2012, Antimalarial Activity of Newly Synthesized Chalcone Derivatives In Vitro, *Chem. Biol. Drug Des.*, 80, 340–347.
- Zakaria, N.H., Hassan, N.I., and Wai, L.K., 2020, Molecular docking study of the interactions between plasmodium falciparum lactate dehydrogenase and 4-aminoquinoline hybrids, *Sains Malaysiana*, 49, 1905–1913.
- Zakiah, M., Syarif, R.A., Mustofa, M., Jumina, J., Fatmasari, N., and Sholikhah, E.N., 2021, In vitro antiplasmodial, heme polymerization, and cytotoxicity of hydroxyxanthone derivatives, *J. Trop. Med.*, 2021, 1–11.
- Zulu, A.I., Oderinlo Ogunyemi O., Kruger, C., Isaacs, M., Hoppe, H.C., Smith, V.J., Veale, C.G.L., and Khanye, S.D., 2017, Synthesis, Structure and In Vitro Anti-Trypanosomal Activity of Non-Toxic Arylpyrrole-Based Chalcone Derivatives, *Molecules*, 22, 1–16.