BAB 5
KESIMPULAN DAN SARAN

5.1 Kesimpulan

1. Senyawa 3,3’,4,4’-tetrametoksidibenzalaseton dapat disintesis dengan mereaksikan 3,4-dimetoksibenzaldehid dan aseton dengan metode konvensional selama waktu sintesis 60 menit dan diperoleh persentase hasil rendemen sebesar 85,69%.
2. Senyawa 3,3’,4,4’-tetrametoksidibenzalaseton (IC_{50} 12,504 µg/ml) memiliki aktivitas sebagai antimalaria yang diuji aktivitasnya secara mikroskopis dengan pewarnaan Giemsa.
3. Aktivitas antimalaria senyawa 3,3’,4,4’-tetrametoksidibenzalaseton (IC_{50} 12,504 µg/ml) tidak lebih aktif dibandingkan senyawa dibenzalaseton (IC_{50} 2,734 µg/ml).
4. Aktivitas antimalaria senyawa 3,3’,4,4’-tetrametoksidibenzalaseton (IC_{50} 12,504 µg/ml) tidak lebih aktif dibandingkan klorokuin (IC_{50} 0,014 µg/ml).

5.2 Saran

1. Dari penelitian yang dilakukan kali ini sintesis senyawa 3,3’,4,4’-tetrametoksidibenzalaseton dapat dilakukan dengan metode pengadukan.
2. Dapat dilakukan pengembangan pengujian senyawa 3,3’,4,4’-tetrametoksidibenzalaseton sebagai senyawa antimalaria dengan pembanding serta jenis parasit yang berbeda.

DAFTAR PUSTAKA

Abu-Lafi, S., Akkawi, M., Abu-Remeleh, Q., Qutob, M., dan Lutgen, P., 2019, Curcumin, a Natural Isolate from Curcuma longa (turmeric) with High β-hematin Inhibitory Potential, *Pharmacy and Pharmacology International Journal*. **7(1)**: 22-26.

Aher, R. B., Wanare, G., Kawathekar, N., Kumar, R., Kaushik, N. K., Sahal, D. dan Chauhan, V. S. 2011, Dibenzylideneacetone Analogues as novel *Plasmodium falciparum* Inhibitors, *Bioorganic and Medicinal Chemistry Letters*, **21(10)**: 3034-3036.

Andrade-Neto, V. F., Pohlit, A. M., Pinto, A. C., Silva, E. C., Nogueira, K. L., Melo, M. R. S., dan Henrique, M. C., 2007, In Vitro Inhibition of Plasmodium Falciparum by Substances Isolated from Amazonian Antimalarial Plants, *Bioorg Med Chem*, **102**: 359-365.

Andromeda, Ekawardhani, S. dan Berbudi, A. 2020, The Role of Curcumin as An Antimaralia Agent, *Systematic Reviews in Pharmacy*, **11(7):** 18-25.

Bawa, S., Kumar, S., Drabu, S., dan Kumar, R., 2010, Structural Modifications of Quinoline-Based Antimalarial Agents: Recent Developments, *Journal of Pharmacy and BioAllied Sciences*, **2(2)**: 64-71.

Bickii, J., Tchouya, G. R. F., Tchouankeu, J. C., & Tsamo, E., 2007, Antimalarial Activity in Crude Extracts of Some Cameroonian Medicinal Plants, *Afr J Trad CAM*., **4(1)**: 107-111.

Brunton, L. L., Hilal-Dandan, R., dan Knollmann, B. C., 2018, Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 13th Ed., New York.

Charris, J. E., Dominguez, J. N., Gamboa, N., Rodrigues, J. R., Angel, J. E., 2005, Synthesis and Antimalarial Activity of E-2-quinolinylbenzocycloalcanones, *European Journal of Medicinal Chemistry*, **40**: 875-881.

Chauhan, I. S., Rao, G. S., Shankar, J., Chauhan, L. K. S., Kapadia, G. J. dan Singh, N. 2018, Chemoprevention of Leishmaniasis: In-Vitro

Antiparasitic Activity of Dibenzalacetone, a Synthetic Curcumin Analog Leads to Apoptotic Cell Death in Leishmania donovani, *Parasitology International*, **67(5)**:627-636.

Chauhan, I.S., Marwa, S., Rao, G.S., dan Singh, N., 2020. Antiparasitic Dibenzalacetone Inhibits the GTPase Activity of Rab 6 Protein of Leishmania donovani (LdRab6), A Potential Target for its Antileishmanial Effect. *Parasitol. Research*. **119**: 2991–3003.

Chainani-Wu, N., 2003. Safety and Anti-Inflammatory Activity of Curcumin: A Component of Tumeric (Curcuma longa). *The Journal Alternative and Complementary Medicine*. **9(1)**: 161-168.

Coatney, G. R., Collins, W. E., dan Contacos, P. G., *The Primate Malarias*. U.S. National Institute of Allergy and Infectious Diseases. pp. 289-299.

Cui, L., Miao, J., dan Cui, L., 2007. Cytotoxic Effect of Curcumin on Malaria Parasite *Plasmodium falciparum*: Inhibition of Histone Acetylation and Generation of Reactive Oxygen Species. *Antimicrobial Agents and Chemotherapy*. **51(2)**: 488-494.

CDC. 2020. Malaria, DPDx – Laboratory Identification of Parasites of Public Health Concern. Centers for Disease Control and Prevention.

Departemen Kesehatan Republik Indonesia, 2008, *Pedoman Penatalaksanaan Kasus Malaria di Indonesia*, Direktur Jendral PP & PL, Jakarta.

Dohutia, C., Chetia, D., Gogoi, K., dan Sarma, K. 2017, Design, In Silico and In Vitro Evaluation of Curcumin Analogues Against *Plasmodium falciparum*, *Experimental Parasitology*, India.doi: 10.1016/j.exppara.2017.02.006.

Dasmasela, K. B. 2021, 'Pengaruh Gugus Hidroksi pada Sintesis Senyawa 4,4'-Dihidroksidibenzalaseton dan Aktivitasnya sebagai Antioksidan'. *Skripsi*¸ Sarjana Farmasi, Universitas Katolik Widya Mandala, Surabaya.

Dasmasela, V. C. 2021, 'Pengaruh Gugus Dimetilamino terhadap Sintesis dan Aktivitas Antioksidan pada Senyawa 4,4'-

dihidroksidibenzalaseton'. *Skripsi*¸ Sarjana Farmasi, Universitas Katolik Widya Mandala, Surabaya

Franco, L. L., Almeida, M. V., Silva, L. F. R., Vieira, P. P. R., Pohlit, A. M., dan Valle, M. S., 2012, Synthesis and Antimalarial Activity of Dihydroperoxides and Tetraoxanes Conjugated with Bis(benzyl)acetone Derivatives, *Chem Biol Drug*, **79**: 790-797.

Furniss, B. S., Hannaford, A. J., Smith P. W. G., dan Tatchell, A. R., 1989, *Vogel's Textbook of Practical Organic Chemistry*, Ed 5th, Longman Scientific & Technical, London.

Gandjar, I. G., dan Rohman, A. 2015, *Kimia Farmasi Analisis*, Pustaka Pelajar, Yogyakarta.

Handayani, S. dan Arty, I. S. 2008, Synthesis of Hydroxyl Radical Scavengers from Benzalacetone and its Derivatives, *Journal of Physical Science*, **19(2)**: 61–68.

Handayani, S., and Arty, I. S. 2009, Synthesis and Activity Test of Some Compounds 1,5-diphenyl-1,4-pentadiene-3-one as Potential Sun Screen Material, *Journal of Physical Science*, **19(2)**: 61-68.

Handayani, S. 2009, Mempelajari Sintesis Senyawa Tabir Surya Melalui Kondensasi Aldol Silang, Universitas Negeri Yogyakarta. *Peningkatan Kualitas Pendidikan dan Penelitian Kimia Menyongsong UNY sebagai World Class University*, Yogyakarta, pp 31-34.

Handayani, S., Matsjeh, S., Anwar, C., dan Atun, S., 2010, Synthesis and Activity Test as Antioxidant of Two Hydroxydibenzalacetones, *Proceedings of Pure and Applied Chemistry International Conference*, Ubon Ratchathani, Thailand.

Harmita. 2015, *Analisis Fisikokimia Potensiometri & Spektroskopi*, Penerbit Buku Kedokteran EGC, Jakarta.

Hewlings, S. J. dan Kalman, D. S., 2017, Curcumin: A Review of Its Effects on Human Health, *Foods*, **6(10)**: 92.

Hidayati, A. R., Widyawaruyanti, A., Ilmi, H., Tanjung, M., Widiandani, T., Siswandono, Syarifuddin, D., dan Hafid A. F., 2020. Antimalarial

Activity of Flavonoid Compound Isolated from Leaves of Artocarpus altilis. *Pharmacognosy Journal*. **12(4)**: 835-842.

Kementrian Kesehatan Republik Indonesia. 2007. Pedoman Pengobatan Malaria.

Kocaadam, B., and Sanlier, N. 2015, Curcumin, an Active Component of Turmeric (Curcuma Longa), and Its Effects on Health, *Crit. Rev.Food Sci. Nutr.*, **57(13)**: 2889–2895.

Kurnianingtyas, M. P. 2019, 'Pengaruh Gugus Kloro pada 4-klorobenzaldehida terhadap Sintesis 4,4'-diklorodibenzalaseton dengan Bantuan Iradiasi Gelombang Mikro'. *Skripsi*¸ Sarjana Farmasi, Universitas Katolik Widya Mandala, Surabaya.

Latifah, N., Subarnas A., dan Chaerunisaa, A. Y. 2020. Antimalaria Medicine and Its Mechanism: A Review. *Majalah Farmasetika*, **5(1)**: 39-48.

Maji, A. K., 2018. Drug Susceptibility Testing Methods of Antimalarial Agents. Tropical Parasitology. **8(2)**: 70 – 76.

Mace, K. E., Lucchi, N. W., dan Tan, K. R., 2021. Malaria Survillance – United States, 2017. *Centers for Disease Control and Prevention.* **70(2)**: 1-35.

McMurry, J. 2012, *Organic Chemistry*. 8th ed. Graphic World Inc, Canada.

McMurry, J. 2016. *Organic Chemistry*, 9th ed. Graphic World Inc, Canada.

Mohrig, J.R., Hammond, C.N. and Schatz, P.F, 2010. *Techniques in Organic Chemistry*, W. H. Freeman and Company, New York.

O'Neil, M. J. 2001, The Merck Index - *An Encyclopedia of Chemicals, Drugs, and Biologicals. 13th Edition.*, Merck and Co. Inc., New Jersey.

Pavia, D. L., Lampman, G. M., Kriz, G. S., dan Vyvyan, J. R. 2015, *Introduction to Spectroscopy 4th Edition*, Nelson Education, Washington.

Prabawati, Wijayanto, dan Wirahadi, 2014, Pengembangan Senyawa Turunan Benzalaseton sebagai Tabir Surya, *Journal of Pharmacy*, **4(1)**: 31-38.

Smith, J. G., 2011, *Organic Chemistry*, 3rd ed., McGraw-Hill, NewYork.

Souza, J. M., Vieira, T. M., Candido, A. C. B. B., Tezuka, D. Y., Rao, G. S., Albuquerque, S. D., Crotti, A. E. M., SiqueiraNeto, J. L., dan Magalhães, L. G., 2021, In Vitro anti-Trypanosoma cruzi Activity Enhancement of Curcumin by its Monoketone Tetramethoxy Analog diveratralacetone. *Current Research in Parasitology & Vector-Borne Diseases*, Vol. 1.

Tamvakopoulos, C., Dimas, K., Sofianos, Z. D., Hatziantoniou, S., Han, Z., Liu, Z. L., Wyche, J. H., dan Pantazis, P., 2007, Metabolism and Anticancer Activity of the Curcumin Analogue, Dimethoxycurcumin, *Clinical Cancer Research*, **13(4)**: 1269-1277.

Tjitra, E., Gunawan, S., Laihad, F., Marwoto, H., Sulaksono, S., Arjoso, S., Richie, T. L., dan Manurung, N., 1997, Evaluation of Antimalarial Drugs in Indonesia, 1981-1995. *Buletin Penelitian Kesehatan*. **25(1)**: 27-58.

World Health Organization, 2011, *Global Plan for Artemisinin Resistance Containment (GPARC)*, WHO Press, Geneva, 19.

World Health Organization. 2012. Management of severe malaria: a practical handbook. Geneva, Switzerland: Geneva, Switzerland: World Health Organization Press.

World Health Organization. 2016. Malaria Microscopy: Quality Assurance Manual, 2nd edition. World Health Organization Press, Italy.

World Health Organization. 2018. World malaria report 2018. Geneva, Switzerland.

Vieira, T. M., dos Santos, I. A., Silva, T. S., Martins, C.H.G., dan Crotti, A. E. M., 2018. Antimicrobial activity of monoketone curcuminoids against cariogenic bacteria, *Chemistry and Biodiversity*, **15(8)**: 5-12.