BAB 5
KESIMPULAN DAN SARAN

5.1 Kesimpulan

1. Senyawa BCP, (4-metoksi)-BCP, (2-metoksi)BCP, dan (3,4-dimetoksi)BCP dapat disintesis melalui reaksi Claisen Schmidt dengan mereaksikan benzaldehid dengan siklopentanon
2. Pengaruh penambahan gugus metoksi pada posisi *para*, *orto*, dan *meta* terhadap sintesis senyawa BCP, (4-metoksi)-BCP, (2-metoksi)BCP, dan (3,4-dimetoksi)BCP yaitu meningkatkan kemudahan terjadinya reaksi kondensasi Claisen Schmidt dan menghasilkan rendeman yang lebih tinggi.
3. Senyawa BCP, (4-metoksi)-BCP, (2-metoksi)BCP, dan (3,4-dimetoksi)BCP tidak memiliki aktivitas antimikroba terhadap *Candida albicans.*
4. Pengaruh penambahan gugus metoksi pada hasil sintesis Senyawa BCP, (4-metoksi)-BCP, (2-metoksi)BCP, dan (3,4-dimetoksi)BCP tidak mempengaruhi aktivitas antimikroba terhadap *Candida albicans.*
5. Pengaruh penambahan jumlah dan posisi gugus metoksi pada hasil sintesis Senyawa BCP, (4-metoksi)-BCP, (2-metoksi)BCP, dan (3,4-dimetoksi)BCP tidak mempengaruhi aktivitas antimikroba terhadap *Candida albicans.*
6. Dibandingkan dengan ketoconazole senyawa turunan BCP tidak memiliki aktivitas antimikroba.

5.2 Saran

1. Perlu dilakukan penelitian lebih lanjut terkait uji aktivitas antimikroba senyawa BCP, (4-metoksi)-BCP, (2-metoksi)BCP, dan (3,4-dimetoksi)BCP dengan penambahan gugus metoksi terhadap mikroba lain.
2. Dilakukan pengujian ulang dengan menggunakan metode lain seperti metode mikro dilusi.

DAFTAR PUSTAKA

Agrawal, N., and Jaiswal, M., 2022, Bioavailability enhancement of curcumin via esterification processes: A review. *European Journal of Medicinal Chemistry Reports*, **6(6)**:100081.

Akash, M., and Rehman, K., 2019, Essentials of pharmaceutical analysis, Springer, Singapore.

Armarego, W. L. F., 2003, Purification of Laboratory Chemicals, 5th eds., Butterworth Heinemann, Australia.

Artanti, L., 2021, 'Gugus Metoksi pada 4-metoksibenzaldehid terhadap Sintesis 2,5-bis(4-metoksibenziliden)siklopentanon', *Skripsi*, Sarjana Farmasi, Universitas Katolik Widya Mandala Surabaya.

Benkova, M., Soukup, O., and Marek, J., 2020, Antimicrobial susceptibility testing: currently used methods and devices and the near future in clinical practice. In *Journal of Applied Microbiology* , **129(4).**

Budiati, T., Soewandi, A., dan Soegianto, L., 2019, Microwave-assisted Synthesis of Dibenzalacetone Derivatives and Study of their Potential Antioxidant Activities. *Journal of Chemical and Pharmaceutical Research*, **11(9):**11–16.

Dohutia, C., Chetia, D., Gogoi, K., and Sarma, K., 2017, Design, in silico and in vitro evaluation of curcumin analogues against Plasmodium falciparum. *Experimental Parasitology*, ***175***:51–58.

Fatmayanti, B. R., Ekananda, S. D., & Tranggono, B. N., 2023, Synthesis and Antioxidant Cyclohexanones Activity of Some. **34(1)**: 93–102.

Hameed, A. R., Ali, S. M., and Ahmed, L., 2018, Biological Study of *Candida* Species and Virulence Factor. *International Journal of Advanced Research in Engineering & Technology*, ***1*(4)**:8–16.

Hussain, Y., Alam, W., Ullah, H., Dacrema, M., Daglia, M., Khan, H., and Arciola, C. R., 2022, Antimicrobial Potential of Curcumin: Therapeutic Potential and Challenges to Clinical Applications. *Antibiotics*, ***11*(3).**

Jeanne Hawkins Van, T., 1984, Ketoconazole Mechanism of Action, Spectrum of Activity, Drug Interactions, Adverse Reactions and P harmaco ki net ics, Therapeutic Use. *Pharmacotherapy*, ***4*(11–12)**: 343–373.

Kalsum, U., dan Ayu, A., 2019, Uji Aktivitas Ekstrak Etanol Umbi Wortel (Daucus carota L.) Sebagai Antifungi Terhadap Pertumbuhan *Candida albicans*. *Warta Farmasi*, **8(2)**: 71–80.

Kusrini, D., Anam, K., Cahyono, B., dan Acidus, P., 2006, Potency of Antimicosis from Some Indonesian Medicinal Plants. *J. Kim. Sains & Apl.*, ***9*(3)**: 69–73.

Langotukan, G.E., 2023, 'Uji Aktivitas Antimikroba Ekstrak Etanol Daun Lamtoro (*Leucaena leucocephala*) Terhadap *Candida albicans', Skripsi*, Sarjana Farmasi, Universitas Katolik Widya Mandala Surabaya.

Lee, Y. S., Chen, X., Widiyanto, T. W., Orihara, K., Shibata, H., and Kajiwara, S., 2022, Curcumin affects function of Hsp90 and drug efflux pump of al *albicans*. *Frontiers in Cellular and Infection Microbiology*, ***12*(9)**: 1–17.

Leepel, L. A., Hidayat, R., Puspitawati, R., dan Bahtiar, B. M., 2009, Efek Penambahan Glukosa pada Saburoud Dextrose Broth terhadap Pertumbuhan Candida albicans (Uji In Vitro). *Journal of Dentistry Indonesia*, ***16*(1):** 58–63.

Lestari, P. E., 2015, Peran faktor virulensi pada patogenesis infeksi *Candida albicans*. *Bagian Ilmu Biomedik Laboratorium Mikrobiologi, Fakultas Kedokteran Gigi Universitas Jember*, 113–117.

Liang, G., Yang, S., Zhou, H., Shao, L., Huang, K., Xiao, J., Huang, Z., and Li, X., 2009, Synthesis, crystal structure and anti-inflammatory properties of curcumin analogues. *European Journal of Medicinal Chemistry*, **44(2)**: 915–919.

Mardianis, Y., Anwar, C., & Haryadi, W., 2017, Sintesis Analog Kurkumin Monoketon Berbahan Dasar Sinamaldehida dan Uji Aktivitasnya sebagai Inhibitor Enzim α-Glukosidase. Jurnal Sains Dasar, **6(2)**: 123–132.

McMurry, J., 2016, Organic Chemistry, 9th eds., Thomson Brooks/Cole, Belmont.

Mun, J., Tam, C., Chan, G., Kim, J. H., Evans, D., & Fleiszig, S., 2013, MicroRNA-762 Is Upregulated in Human Corneal Epithelial Cells in Response to Tear Fluid and Pseudomonas aeruginosa Antigens and Negatively Regulates the Expression of Host Defense Genes Encoding RNase7 and ST2. PLoS ONE, **8(2)**: 1–8.

Nocito, M. C., De Luca, A., Prestia, F., Avena, P., La Padula, D., Zavaglia, L., Sirianni, R., Casaburi, I., Puoci, F., Chimento, A. and Pezzi, V., 2021, Antitumoral activities of curcumin and recent advances to improve its oral bioavailability, Biomedicines, **9**: 1–38.

O`Neil, M., 2006, *The Merck Index An Encyclopedia of Chemicals,Drugs, and Biologicals*. Merck & Co., INC.

Pavia, D. L., Lampman, G.M., Kriz, G. S., and Vyvyan, J.R., 2009, Introduction to Spectroscopy, 4th eds., Brooks/Cole, Belmont.

Pudjono, Supardjan, dan Irawati, T., 2006, Sintesis 2,5 dibenzilidinsiklopentanon dari Benzaldehid dan Siklopentanon dengan Variasi Pelarut, Majalah Farmasi Indonesia, **17(1)**: 45-49.

Rahmawati, E. N., Teruna, H. Y., dan Zhamri, A., 2018, Sintesis Dan Uji Toksisitas Senyawa Analog Kurkumin 3,5-Bis((E)-Metoksi Benziliden)-1-(Fenilsulfonil)-Piperidin-4-on. *Photon: Jurnal Sain Dan Kesehatan*, ***9*(1)**: 151–158.

Rahmawati, I., dan Purwaningsih, D., 2018, Uji Aktivitas Antijamur Beberapa Senyawa Monokarbonil Analog Curcumin Hasil Sintesis. *Jurnal Bioteknologi & Biosains Indonesia (JBBI)*, ***5*(2)**: 149.

Rahul Jodh, Mukund Tawar, Gaurav Mude, Hitesh Khodaskar, Karishma Kinekar, 2023, Ketoconazole: A Promising Drug for Fungal Infections. Asian Journal of Research in Pharmaceutical Sciences, **13(2)**:101-5.

Revalde, J. L., Li, Y., Hawkins, B. C., Rosengren, R. J., and Paxton, J. W., 2015, Heterocyclic cyclohexanone monocarbonyl analogs of curcumin can inhibit the activity of ATP-binding cassette transporters in cancer multidrug resistance. *Biochemical Pharmacology*, ***93*(3)**: 305–317.

Ruiz, K., López, M., Suppan, G., and Makowski, K., 2020, Crossed Aldol Reactions in Water Using Inexpensive and Easily Available Materials as a Tool for Reaction Optimization Teaching in an Undergraduate Organic Chemistry Laboratory, Journal of Chemical Education, **97(10)**: 3806-3809.

Sachivkina, N., Podoprigora, I., and Bokov, D., 2021, Morphological characteristics of *Candida albicans*, *Candida krusei*, *Candida guilliermondii*, and *Candida glabrata* biofilms, and response to farnesol. *Veterinary World*, ***14*(6)**: 1608–1614.

Siswandono., 2016, *Kimia Farmasi Medisinal Edisi Kedua*.

Sophia, A., Adinegoro, J. K., Kalumpang Lubuk Buaya, S., dan Barat, S., 2022, Bioma : Jurnal Biologi Makassar (On Line) Efektivitas Aquabidest Dan Limbah Air Ac Sebagai Pelarut Media Sda Untuk Pertumbuhan Candida Albicans The Effectiveness Of Aquabidest And Ac Water As A Solution Of Sda Media For The Growth Of Candida Albicans. *Jurnal Biologi Makassar*, ***8*(1)**: 16–22.

Swandiyasa, K., Puspawati, N. M., dan Asih, I. A. R. A., 2019, Potensi Daun Cendana (Santalum album L.) Sebagai Senyawa Penghambat Jamur *Candida albicans*. *Jurnal Kimia*, 159.

Suzana, Ika, M., Poerwono, H., dan Budiati, T., 2013, Pengaruh Gugus Metoksi Posisi Orto (O) Dan Para (P) Pada Benzaldehida Terhadap Sintesis Turunan Khalkon Dengan Metode Kondensasi Aldol. *Berkala Ilmiah Kimia Farmasi*, ***2*(1)**: 22–27.

Theresih, K., dan Budimarwanti, C., 2016, Pengaruh Gugus P-Metoksi Pada Reaksi Kondensasi Claysen-Schmidt Menggunakan Metoda Grinding. *Jurnal Sains Dasar*, ***5*(2)**: 124.

Vanderwall, M., and Strine, M. S., 2022, Antimicrobial Resistance. *Yale Journal of Biology and Medicine*, ***95*(4)**: 405–406.

Vogel, A. I., 1956, A Textbook of Practical Organic Chemistry Including Qualitative Organic Analysis, Logman, London.

WHO, 2022, WHO fungal priority pathogens list to guide research, development and public health action. In *Licence: CC BY-NC-SA 3.0 IGO* (Vol. 1).

Liang, G., Shao, L., Wang, Y., Zhao, C., Chu, Y., Xiao, J., Zhao, Y., Li, X., and Yang, S., 2009, Exploration and synthesis of curcumin analogues with improved structural stability both in vitro and in vivo as cytotoxic agents, Bioorganic & Medicinal Chemistry, **17(6):** 2623-2631.

Zhao, F., Dong, H. H., Wang, Y. H., Wang, T. Y., Yan, Z. H., Yan, F., Zhang, D. Z., Cao, Y. Y., and Jin, Y. S., 2017, Synthesis and synergistic antifungal effects of monoketone derivatives of curcumin against fluconazole-resistant *Candida* spp. *MedChemComm*, ***8*(5):** 1093–1102.

Zulkarnain, Z., Muthiadin, C., Nur, F., dan Rukmana, R., 2019, Efektivitas Antifungi Ekstrak Daun Patikan Kebo (Euphorbia hirta) Terhadap

Jamur Penyebab Kandidiasis (*Candida albicans*). *Al-Hayat: Journal of Biology and Applied Biology*, ***2*(1)**: 22.