

BAB 5

KESIMPULAN DAN SARAN

5.1. Kesimpulan

Berdasarkan dari penelitian yang telah dilakukan, dapat disimpulkan bahwa:

1. Sintesis senyawa dibenzalaseton dapat dilakukan dengan mereaksikan benzaldehida dan aseton melalui mekanisme kondensasi *Claisen-Schmidt* dengan katalis NaOH dalam pelarut THF dengan bantuan iradiasi gelombang mikro (160 Watt, 10 menit) dengan persentase rendemen sebesar $58,41 \pm 8,98\%$.
2. Sintesis senyawa 4,4'-dihidroksidibenzalaseton dapat dilakukan dengan mereaksikan 4-hidroksibenzaldehida dan aseton melalui mekanisme kondensasi *Claisen-Schmidt* dengan katalis NaOH dalam pelarut THF dengan bantuan iradiasi gelombang mikro (160 Watt, 10 menit) dengan persentase rendemen $6,75 \pm 0,93\%$.
3. Adanya substituen hidroksi pada 4-hidroksibenzaldehida mempersulit reaksi kondensasi *Claisen-Schmidt* dengan katalis NaOH pada pelarut THF dengan bantuan iradiasi gelombang mikro ditinjau dari persentase rendemen sintesis.

5.2. Saran

1. Dilakukannya identifikasi terhadap hasil samping yang mungkin dihasilkan dari reaksi.
2. Optimasi dapat dilakukan lebih lanjut khususnya untuk lama pemanasan 10 – 20 menit.

3. Metode sintesis dapat dikembangkan lebih lanjut menggunakan katalis asam untuk menggantikan katalis basa NaOH yang digunakan.
4. Penelitian ini dapat dikembangkan lebih lanjut untuk mengetahui efek farmakologis dari senyawa 4,4'-dihidroksidibenzalaseton.

DAFTAR PUSTAKA

- Ahluwalia, V.K. and Kidwai, M. 2004, *New Trends in Green Chemistry*, Anamaya Publishers, New Delhi.
- Ahluwalia, V.K. and Dhingra, S. 2000, *Comprehensive Practical Organic Chemistry Quantitative Analysis*, Universities Press, Hyderabad.
- Ameta, C., Dashora, P. and Vyas, R. 2015, 'Instrumentation', in Ameta, S.C., Punjabi, P.B., Ameta, R. and Ameta, C., *Microwave-Assisted Organic Synthesis: A Green Chemical Approach*, Apple Academic Press, Toronto, pp 15-29.
- Ameta, S.C. 2015, 'Introduction', in Ameta, S.C., Punjabi, P.B., Ameta, R. and Ameta, C., *Microwave-Assisted Organic Synthesis: A Green Chemical Approach*, Apple Academic Press, Toronto, pp 1-13.
- Bruice, P.Y. 2017, *Organic Chemistry Eighth Edition*, Pearson Education, Upper Saddle River.
- Clayden, J., Greeves, N. and Warren, S. 2012, *Organic Chemistry Second Edition*, Oxford University Press, New York.
- Das, B., Thirupathi, P., Mahender, I., Reddy, K.R. 2006. Convenient and facile cross-Aldol condensation catalyzed by molecular iodine: An efficient synthesis of α,α' -bis(substituted-benzylidene) cycloalkanones, *Journal of Molecular Catalysis A: Chemical*, **247**: 182–185.
- Dewanty, T. 2011, 'Sintesis dan Karakterisasi Senyawa 4-hidroksibenzalaseton dengan Menggunakan Reaksi Kondensasi Aldol Silang', *Skripsi*, Sarjana Pendidikan Kimia, Universitas Yogyakarta.
- Donglikar, M.M. and Deore, S.L. 2017, Development and Evaluation of Herbal Sunscreen, *Pharmacognosy Journal*, **9(1)**: 83-97.
- Franco, L.L., Almeida, M.V., Silva, L.F.R., Vieira, P.P.R., Pohlit, A.M. and Valle, M.S., 'Synthesis and Antimalarial Activity of Dihydroperoxides and Tetraoxanes Conjugated with Bis(benzyl)acetone Derivatives', *Chemical Biology and Drug Design* 2012, **79**: 790-797.
- Gandjar, I.G. dan Rohman, A. 2015, *Kimia Farmasi Analisis*, Pustaka Pelajar, Yogyakarta.

- Handayani, S. 2009, 'Synthesis and Activity Test of Two Asymmetric Dibenzalacetones as Potential Sunscreen Material', Chemical, Biological and Environmental Engineering, *The 2009 International Conference on Chemical, Biological and Environmental Engineering*, Singapore, pp 119-122.
- Handayani, S. 2012, 'Synthesis of Benzalacetone Analogue Over NaOH-/ZrO₂-montmorillonite as Catalyst and Its Antioxidant Activity Test', Desertasi, Doktor Ilmu Kimia, Universitas Gadjah Mada, Yogyakarta.
- Handayani, S. 2014, 'Study of Acid Catalysis for Condensation of 4-Hydroxybenzaldehyde with Acetone, Universitas Negeri Yogyakarta, *International Conference on Research, Implementation and Education of Mathematics and Sciences 2014*, Yogyakarta, Indonesia, C-24.
- 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., Budimarwanti, S. and Haryadi, W. 2017, Microwave-Assisted Organic Reactions: Eco-friendly Synthesis of Dibenzylidenecyclohexanone Derivatives via Crossed Aldol Condensation, *Indonesian Journal of Chemistry*, **17 (2)**: 336-341.
- Handayani, S., Matsjeh, S., Anwar, C. and Atun, S. 2010, 'Synthesis and activity test as antioxidant of two hydroxydibenzalacetones', Pure and Applied Chemistry, *Challenges in Chemistry for Sustainable Development*, Ubon Ratchathani, Thailand. pp. 686–688.
- Harmita. 2015, *Analisis Fisikokimia Potensiometri & Spektroskopi*, Penerbit Buku Kedokteran EGC, Jakarta.
- Jayaprakasha, G. K., Rao, L. J., Mohan, M., & Sakariah, K. S. 2002. Improved HPLC method for the determination of curcumin, demethoxycurcumin and bisdemethoxycurcumin. *Journal of Agricultural and Food Chemistry*, **50**: 3668–3672.
- Mazzarello, A. J., Szatyłowicz, H. and Krygowski, T.M. 2012, Interference of H-bonding and Substituent Effect in Nitro- and Hydroxy-Substituted Salicylaldehydes, *Journal of Molecular Modeling*, **18**: 127-135.
- Kar, A. 2005, *Pharmaceutical Drug Analysis Second Edition*, New Age International, New Delhi.

- Mahrwald, R. (ed), 2004, *Modern Aldol Reaction*, WILEY-VCH Verlag GmbH & Co. KgaA, Weinheim.
- McMurry, J. 2016, *Organic Chemistry Ninth Edition*, Cengage Learning, Boston.
- Moffat, A.C., Osselton, M.D. and Widdop, B. (eds). 2011, *Clarke's Analysis of Drugs and Poisons in pharmaceuticals, body fluids and postmortem material*, Pharmaceutical Press, London.
- Mohrig, J.R., Hammond, C.N. and Schatz, P.F, 2010. *Techniques in Organic Chemistry*, W.H Freeman and Company, New York.
- Pavia, D.L., Lampman, G.M., Kriz, G.S., Vyvyan, J.R. 2015. *Introduction to Spectroscopy fifth edition*, Cengage Learning, Stamford.
- Prabawati S.Y., Wijayanto, A. dan Wirahadi, A. 2014, Pengembangan Senyawa Turunan Benzalaseton Sebagai Senyawa Tabir Surya. *Pharmacia*, **4**: 31-38.
- Pudjono, Sismindari dan Widada H. 2008, Sintesis 2,5-bis-(4'-hidroksi benzilidin) siklopentanon dan 2,5-bis-(4'-klorobenzilidin) siklopentanon serta uji antiproliferatifnya terhadap sel HeLa, *Majalah Farmasi Indonesia*, **19(1)**: 48 – 55.
- Rayar, A., Veitia, M.S. and Ferroud, C. 2015, An efficient and selective microwave-assisted Claisen-Schmidt reaction for the synthesis of functionalized benzalacetones, *Springerplus*, **4**:221.
- Rowe, R.C., Sheskey, P.J. and Quinn, M.E. (eds). 2009, *Handbook of Pharmaceutical Excipients Sixth Edition*, Pharmaceutical Press, London.
- Saleh, A.B.B. and Abdulah, M. 2006. 'Synthesis and Study of Some Dibenzylidene Acetone', Sebha University, *The First Conference on Recent Developments in Chemistry and Their Applications*, Sebha, Libya, pp. 113-120.
- Sardjiman, Utami, D., Dachlan, Intani, D. dan Susanty, R.F. 2007, Optimasi sintesis 4-dimetilamino benzalaseton dengan variasi kecepatan dan waktu reaksi menggunakan katalisator natrium hidroksida, *Majalah Farmasi Indonesia*, **18(4)**: 176-182.
- Silverstein, R.M., Webster, F.X. and Kiemle, D.J. 2005, *Spectrometric Identification of Organic Compounds Seventh Edition*, John Wiley & Sons, Hoboken.

- Solomons, T.W.G., Fryhle, C.G. and Snyder, S.A. 2016, *Organic Chemistry Twelfth Edition*, John Wiley & Sons, Hoboken.
- Tahir, I., Wijaya, K., Suharni T. dan Wahyuningsih, T.D. 2004, Analisis *In Silico* Senyawa Tabir Surya Alkil Sinamat Berdasarkan Perhitungan Transisi Elektronik dengan Metode ZINDO/s, *Jurnal Farmasi Sains dan Komunitas*, **2**: 230-240.
- Wade, L.G and Simek, J.W. 2016, *Organic Chemistry Ninth Edition*, Pearson, Upper Saddle River.
- Wang, Z. 2010, *Comprehensive Organic Name Reaction and Reagents*, John Wiley & Sons, Hoboken.
- Warsi, W., Sardjiman, S. dan Riyanto, S. 2018, Synthesis and Antioxidant Activity of Curcumin Analogues, *Journal of Chemical and Pharmaceutical Research*, **10(4)**: 1-9.
- Wilken, R., Veena, M.S., Wang, M.B. and Srivatsan, E.S. 2011, Curcumin: A review of anti-cancer properties and therapeutic activity in head and neck squamous cell carcinoma, *Molecular Cancer*, **10**:12.