

## **BAB 5**

### **KESIMPULAN DAN SARAN**

#### **5.1 Kesimpulan**

1. Kondisi optimum sintesis senyawa 2,5-dibenzilidensiklopantanon dengan bantuan iradiasi gelombang mikro pada daya 600 Watt (P30) selama 30 detik dengan persentase rendemen sebesar  $90,28\pm9,6\%$ .
2. Senyawa 2,5-bis-(3',4'-dimetoksibenziliden)siklopantanon dapat disintesis dengan mereaksikan 3,4-dimetoksibenzaldehid dan siklopantanon pada kondisi yang sama dengan sintesis senyawa 2,5-dibenzilidensiklopantanon dengan bantuan iradiasi gelombang mikro pada daya 600 Watt (P30) selama 30 detik dengan persentase rendemen sebesar  $98,58\pm1,31\%$ .
3. Pengaruh substituen dimetoksi posisi 3,4 dari 3,4-dimetoksi benzaldehyda terhadap sintesis senyawa 2,5-bis-(3',4'-dimetoksi benziliden)siklopantanon mempermudah jalannya reaksi kondensasi aldol silang dibandingkan dengan sintesis senyawa 2,5-dibenziliden siklopantanon dengan menggunakan benzaldehyda tanpa substituen ditinjau dari perbandingan persentase rendemen sintesis.

#### **5.2 Saran**

Perlu dilakukan uji aktivitas untuk mengetahui khasiat senyawa yang telah disintesis.

## DAFTAR PUSTAKA

- Aggarwal, B.B., Sundaram, C., Malani, N., and Ichikawa, H., 2007, Curcumin: The Indian Solid Gold, *The Molecular Targets and Therapeutic Uses of Curcumin in Health and Disease*, **595**:1-49.
- Ali, B.H., Blunden, G., Tanira, M.O., and Nemmar, A., 2008, Some phytochemical, pharmacological and toxicological properties of ginger (*Zingiber officinale* Roscoe): a review of recent research, *Food and Chemical Toxicology*, **46**(2):409-420.
- Ali, B.H., Marrif, H., Noureldayem, S.A., Bakheit, A.O. and Blunden, G., 2006, Some biological properties of curcumin, *Natural Product Communications*, **1**(6):509-521.
- Ameta, S. C., Punjabi, P. B., Ameta, R., and Ameta, C., 2015, Microwave-Assisted Organic Synthesis: A Green Chemical Approach, 1<sup>st</sup> ed., Apple Academic Press Inc., Canada.
- Anisa, D.N., Anwar, C., dan Afriyani, H., 2020, Sintesis Senyawa Analog Kurkumin Berbahan Dasar Veratraldehida Dengan Metode Ultrasound, *Analit: Analytical and Environmental Chemistry*, **5**(1):74-81.
- Anand, P., Kunnumakkara, A.B., Newman, R.A., and Aggarwal, B.B., 2007, Bioavailability of Curcumin: Problems and Promises, *Molecular Pharmaceutics*, **4**:807-818.
- Aschenbrenner, D.S., and Venable, S.J., 2009, *Drug Therapy in Nursing*, 3<sup>rd</sup> edition, Lippincott Williams & Wilkins, Philadelphia.
- Bruice, P.Y., 2007, *Organic Chemistry Fifth edition*, Pearson College, New York.
- Budimarwanti, C., 2009, ‘Penyediaan Senyawa Berkhasiat Obat Secara Sintesis dengan Analisis Retrosintesis’, *Prosiding Seminar Nasional Penelitian, Pendidikan, dan Penerapan MIPA*, UNY, Yogyakarta, pp. 158-165.
- Butcher, R.J., Jasinski, J.P., Narayana, B., Sarojini, B.K., Bindya, S., and Yathirajan, H.S., 200, *2,5-Bis (3,4-dimethoxybenzylidene)cyclopentanone*, *Acta Crystallographica Section E: Structure Reports Online*, **63**(7):o3270-o3271.

- Chattopadhyay, I., Biswas, K., Bandyopadhyay, U., and Banerjee, R.K., 2004, Turmeric and curcumin: Biological actions and medicinal applications, *Current Science*, **87(1)**:44-53.
- England, R., 2003, *Microwave Synthesis: a New Wave of Synthetic Organic Chemistry*, LabPlus International, Uppsala.
- Eryanti, Y., Nurulita, Y., Hendra, R., Yuhamen, Y., Syahri, J., and Zamri, A., 2012, Synthesizing derivatives from cyclopentanone analogue curcumin and their toxic, antioxidant and anti-inflammatory activities, *Makara Journal of Science*, **15(2)**:117-123.
- Gandjar, I. G. dan Rohman, A., 2010, *Kimia Farmasi Analisis*, Pustaka Pelajar, Yogyakarta.
- Gilbert, J.C. and Martin, S.F., 2011, *Experimental Organic Chemistry, A Miniscale and Microscale Approach Fifth Edition*, Cengage Learning, Boston.
- Grundas, S., 2011, Advances in Induction and Microwave Heating of Mineral and Organic Materials, 1<sup>st</sup> ed., InTech, Rijeka.
- Handayani, S., Budimawati, C., dan Haryadi, W., 2017, Microwave-assisted organic reactions: eco-friendly synthesis of dibenzylidenehexanone derivatives via crossed aldol condensation, *Indonesian Journal of Chemistry*, **17(2)**:336-341.
- Handayani, S., Sunarto, S., dan Kristianingrum, S., 2005, Optimization of time reaction and hydroxide ion concentration on flavonoid synthesis from benzaldehyde and its derivatives, *Indonesian Journal of Chemistry*, **5(2)**:163-168.
- Liang, G., Yang, S., Jiang, L., Zhao, Y., Shao, L., Xiao, J., Ye, F., Li, Y. and Li, X., 2008, Synthesis and anti-bacterial properties of mono-carbonyl analogues of curcumin, *Chemical & Pharmaceutical Bulletin*, **56(2)**:162–167.
- Mardianis, Y., Anwar, C., dan Haryadi, W., 2017, Sintesis analog kurkumin monoketon berbahan dasar sinamaldehida dan uji aktivitasnya sebagai inhibitor enzim  $\alpha$ -glukosidase, *Jurnal Sains Dasar*, **6(2)**:123-132.
- McMurry, J. E., 2016, *Organic Chemistry*, 9<sup>th</sup> ed, Graphic World Inc, Boston.
- 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., Heckelman, P., Koch, C., Roman, and K., Kenny, C. (Eds.), 2006, *The Merck Index*, 14th Ed, Merck & Co., Inc., New Jersey.
- Pavia, D. L., Lampman, G. M., Kriz, G. S., and Vyvyan, J. R., 2009, *Introduction to Spectroscopy*, 4<sup>th</sup> ed, Brooks/Cole, Washington.
- Pudjono, Supardjan, dan Irawati T., 2006, Sintesis 2,5-dibenzilidin siklopentanon dari benzaldehid dan siklopentanon dengan variasi pelarut, *Majalah Farmasi Indonesia*, **17(1)**:45-49.
- Ritmaleni. dan Simbara, A., 2010, Sintesis Tetrahidropentagamavunon-0, *Majalah Farmasi Indonesia*, **21(21)**: 3547-3549.
- Robinson, T.P., Ehlers, T., Hubbard Iv, R.B., Bai, X., Arbiser, J.L., Goldsmith, D.J. and Bowen, J.P., 2003, Design, synthesis, and biological evaluation of angiogenesis inhibitors: aromatic enone and dienone analogues of curcumin, *Bioorganic & Medicinal Chemistry Letters*, **13(1)**:115-117.
- Rouessac F., and Rouessac, A., 2007, *Chemical Analysis: Modern Instrumentation Methods and Techniques*, 2<sup>nd</sup> ed., John Wiley & Sons, Ltd., West Sussex.
- Sardjiman, S.S., Reksohadiprodjo, M.S., Hakim, L., van der Goot, H., and Timmerman, H. 1997, 1,5-Diphenyl-1,4-pentadiene-3-ones and cyclic analogues as antioxidative agents. Synthesis and structure-activity relationship, *European Journal of Medicinal Chemistry*, **32**:625-630.
- Skoog, D.A., Holler, F.J., Crouch, S.R., 2006, *Principles of Instrumental analysis*, 6<sup>th</sup> ed., Brooks Cole, Belmont.
- Smith, J.G., 2011, *Organic Chemistry*, 3<sup>rd</sup> ed., McGraw-Hill, New York.
- Suzana, M.I., Kholis, A.N., Juni, E., Marcellino, R., Hadi, P. and Tutuk, B., 2013, Pengaruh Gugus Metoksi Posisi orto (*o*) dan para (*p*) pada Benzaldehyda terhadap sintesis turunan kalkon 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)**:124-132.
- Youssef, K. M., and El-Sherbeny, M. A. 2005, Synthesis and antitumor activity of some curcumin analogs, *Archiv der Pharmazie: An International Journal Pharmaceutical and 31 Medicinal Chemistry*, **338(4)**: 181-189.