

## **BAB 5**

### **KESIMPULAN DAN SARAN**

#### **5.1      Kesimpulan**

Hasil penelitian yang telah dilakukan ekstrak etanol bawang merah dengan menggunakan *Enhancer* Na-lauril sulfat memiliki aktivitas antipiretik terhadap penurunan temperatur tikus putih yang dinduksi vaksin DPT.

#### **5.2      Saran**

Berdasarkan hasil penelitian dapat disarankan hal-hal sebagai berikut :

1. Perlunya penelitian lebih lanjut terhadap uji toksitas pada *patch* ekstrak etanol bawang.
2. Perlu dilakukan penelitian tentang kombinasi *enhancer* dalam sediaan *patch* topikal antipiretik ekstrak etanol bawang merah untuk meningkatkan penitrasikan bahan aktif ke kulit.

## DAFTAR PUSTAKA

- Amalia, R. 2009, ‘Uji Evaluasi dan Formulasi Sediaan patch Transdermal Natrium Diklofenak Sistem Matriks Kombinasi Menggunakan Polimer Etil Selulosa dan HPMC K-4M’, *Skripsi*, Sarjana Farmasi, Universitas Katolik Widya Mandala, Surabaya.
- Barhate, A.L., Shinde, S.N., Sali, S.M., Ingale, D.K., Choudari, V. P. and Kuchekar, B. S. 2009, Fabrication of Controlled Release Metoprolol Succinate Matrix Tablet: Influence of Some Hydrophilic Polymers on the Release Rate and In Vitro Evaluation, *International Journal Pharmacy World Reseach*, **1(2)**: 1-15.
- Boolootion, R.A., 1991, *Zoologi*, Macmillan Publishing Co., Inc. . New York
- Budhathoki, U. 2005, Effect Of Chemical Enhancer On In Vitro Release Of Salbutamol Sulphate From Transdermal Patches, *Khatmandu University Journal of Science, Engineering and Technology*, **1(1)**: 1-6.
- Cross, S.E. and Roberts, M.S. 2004, Physical Enhancement Of Transdermal Drug Application: Is Delivery Technology Keeping Up With Pharmaceutical Development, *Current Drug Delivery*, **1**: 81–92.
- Departemen Kesehatan Republik Indonesia, 2014, *Farmakope Indonesia* Edisi V, Jakarta: Direktorat Jenderal Pengawasan Obat dan Makanan, hal. 998.
- Dinarello, C.A. and Gelfand, J.A. 2005, ‘Fever and Hyperthermia’, in Kasper, D.L., *Harrison's Principles of Internal Medicine*, 16<sup>th</sup> ed., The McGraw-Hill Company, Singapore, pp 104-108.
- EMA. 2015, Background Review For Sodium Lauilsulfate Used as an Excipient, *European Medicines Agency Science Medicines Healty*, **(4): 4-18**.
- Freddy, I.W. 2007, *Farmakologi dan Terapi* Edisi 5, Bagian Farmakologi Fakultas Kedokteran Universitas Indonesia, Jakarta, hal. 209-217.
- Ganong, F.W. 2008, *Buku Ajar Fisiologi Kedokteran* Edisi 22, EGC, Jakarta, hal. 110-125.
- Garala, K.C., Shinde, A. and Shah, P. 2009, Formulation and in vivo Characterization of Monolithic Matrix Transdermal System Using HOMC/Eudragit S100 Polymer Blends, *International Journal of Pharmacy and Pharmaceutical Sciences*, **1(1)**: 108-120.

- Gungor, S., Erdal, M.S. and Ozsoy, Y. 2012, 'Plasticizer in Transdermal Drug Delivery Systems', in Luqman, M., *Recent Advances in Plasticizers*, In Tech, Shanghai, pp 91-112.
- Gupta, J.R.D., Ircihhiaya, R., Garud, N., Tripathi, P., Dubey, P. and Patel, J.R. 2009, Formulation and Evaluation of Matrix Type Transdermal Patches of Glibenclamide, *International Journal of Pharmaceutical Sciences and Drug Research*, **1(1)**: 46-50.
- Gupta, P.N., Mishra, V., Rawat, A., Dubey, P. and Mahor, S. 2005, Non-Invasive Vaccine Delivery In Transfersomes, Niosomes And Liposomes: A Comparative Study, *International Journal of Pharmaceutical Sciences and Drug Research*, **293**: 73-82.
- Guyton, A.C. dan Hall, J.E. 2008, *Buku Ajar Fisiologi Kedokteran*, Diterjemahkan dari Bahasa Inggris oleh Setiawan, EGC, Jakarta.
- Hammond, R.N. and Boyle, R.N. 2011, Pharmacological Versus Nonpharmacological Antipyretic Treatments In Febrile Critically Ill Adult Patients: A Systematic Review And Meta- Analysis, *Australian Critical Care*, **24**: 4-17.
- Harborne, J.B. 1987, *Metode Fitokimia*, Diterjemahkan dari Bahasa Inggris oleh Kosasih dan Iwang S.J, Edisi 2, Penerbit ITB, Bandung, hal. 69-84.
- Jaelani, 2007, *Khasiat Bawang Merah*, Kanisius, Yogyakarta, hal. 34-35.
- Jansen, I. 2015, 'Uji Efek Antipiretik Ekstrak Meniran (*Phyllanthus niruri* L.) pada Tikus Wistar (*Rattus norvegicus*) Jantan yang Diinduksi Vaksin DPT-HB', Skripsi, Sarjana Kedokteran, Universitas Sam Ratulangi, Manado.
- Kandavilli, S., Nair, V. and Phancagnula, R. 2002, Polymer in Transdermal Drug Delivery System, *Pharmaceutical Technology*, 62-80.
- Kaneshiro, N.K. and Zieve, D. 2013, 'Fever', *University of Washington*. Diakses pada 10 Oktober 2017, <http://www.nlm.nih.gov/medlineplus/ency/article/000980.htm>.
- Karande, P. and Mitragotri, S. 2009, Enhancement Of Transdermal Drug Delivery Via Synergistic Action Of Chemicals, *Biochimica Et Biophysica Acta*, **1788**: 2362-2373.
- Katzung, B.G. 2007, *Basic & Clinical Pharmacology*, 10<sup>th</sup> ed., The McGraw-Hill Companies, San Francisco, pp 573-599.

- Khan, N.R., Khan, G. M., Khan, A.R., Wahab, A., Asghar, M.J., Akhlaq M., and Hussain, A. 2012, Formulation, Physical, In Vitro and Ex Vivo Evaluation of Diclofenac Diethylamine Matrix Patches Containing Turpentine Oil as Penetration Enhancer, *African Journal of Pharmacy and Pharmacology*, **6(6)**: 434-439.
- Kusumawati, D. 2004, *Bersahabat dengan hewan coba* Edisi 1, Universitas Gajah Mada, Yogyakarta, hal. 88-91.
- Markham, K. R. 1998, *Cara Mengidentifikasi Flavonoid*, Penerbit ITB, Bandung, hal. 39-41.
- Murthy, R.S.R., Arora, N. and Agarwal, S. 2012, Latest Technology Advances In Cosmaceuticals, *International Journal of Pharmaceutical Sciences and Drug Research*, **4(3)**: 168-182.
- Nelwan, R.H. 2009, ‘Demam: Tipe dan Pendekatan’, dalam Sudoyo, A.W., Setiyohadi, B., Alwi, I., Simadibrata, M., dan Setiati, S., *Buku Ajar Ilmu Penyakit Dalam*, Jilid III, Edisi 5, Internal Publishing, Jakarta hal. 2767-2768.
- Pandey, A., Mittal, A., Chauhan, N. and Alam, S. 2014, Role of Surfactants as Penetration Enhancer in Transdermal Drug Delivery System, *Molecular Pharmaceutics and Organic Process Research*, **2(2)**: 2-10.
- Patel, R.H., Patel, G.N., Patel, R.B. and Patel, M.M. 2009, Development of Dual Layers Drugs Delivery for Motion Sickness, *International Journal of Pharm Tech Research*, **1(2)**:173-178.
- Patel, D., Chaudhary, S.A., Parmar, B. and Bhura, N. 2012, Transdermal Drug Delivery System: A Review, *The Pharma Journal*, **1(4)**: 66-75.
- Perdanakusuma, D.S. 2007, *Anatomi Fisiologi Kulit Dan Penyembuhan Luka*, Surabaya: Airlangga University School Of Medicine–Dr. Soetomo General Hospital. hal.1-8.
- Phadtare, D., Phadtare, G. and Asawat, M. 2014, Hypromellose – A choice of Polymer in Extended Release Tablet Formulation, *World Journal of Pharmacy and Pharmaceutical Sciences*, **3(9)**: 551–566.
- Pitojo, S. 2003, *Benih Bawang Merah*, Kansius, Yogyakarta.
- Proverawati, A. dan Andhini, C.S.D. 2010, *Imunisasi dan Vaksinasi*, Nuha Medika, Yogyakarta.
- Rama, R.P., Narendra, R.M., Sistla, R. and Prakash, V.D. 2003, Comparative In Vivo Evaluation Of Propranolol Hydrochloride After Oral And

- Transdermal Administration In Rabbits, *European Journal of Pharmaceutics and Biopharmaceutics*, **56**: 81–85.
- Robinson, T. 1995, *Kandungan Organik Tumbuhan Tinggi*, Diterjemahkan dari Bahasa Inggris oleh Kosasih, Edisi keenam, Penerbit ITB, Bandung, hal. 71-72, 191-195, 208-215.
- Rohit, S., Khaleel, A. and Santani, D.D. 2011, Reporting And Monitoring Of Adverse Drug Reactions With Cardiac Drugs, *International Research Journal Of Pharmacy*, **2(7)**: 116–199.
- Rowe, R.C., Shesky, P. and Owen, S. 2006, *Handbook of Pharmaceutical Excipients*, 5<sup>th</sup> ed, Pharmaceutical Press, London, .pp 261-267, 326-329, 592-594.
- Sachan, R. and Bajpai, M. 2013, *Transdermal Drug Delivery System: A Review*, *International Journal of Research and Development in Pharmacy and Life Sciences*, **3(1)**: 748-765.
- Salager, J.L. 2002, *Surfactants types and uses*, De Los Andes University, Venezuela.
- Sardjono, S. dan Hadi, R.D. 2007, *Farmakologi Dan Terapi* Edisi 5, Departemen Farmakologi dan Terapeutik Fakultas Kedokteran Universitas Indonesia, Jakarta, hal 210-246.
- Shah, S.N.H., Rabbani, M and Amir, M.F. 2005, In Vitro Study Of Percutaneous Absorption Of Diclofenac In The Presence Of Sodium Lauryl Sulphate Through Rabbit Skin, *J. Res. Sci.*, **16**: 45-50.
- Sharma, S. 2008, Topical Drug Delivery System; A Review, *Pharmaceutical review*, **6**: 1-29.
- Sherwood, L. 2001, *Fisiologi manusia: dari sel ke sistem*, Diterjemahkan dari Bahasa Inggris oleh Yesdelita, N., EGC, Jakarta.
- Sholehah, M. 2011, ‘Optimasi HPMC sebagai Matriks dan Menthol sebagai Enhancer terhadap Penetrasi Propanolol HCL dalam Sediaan Patch Transdermal’, Skripsi, Sarjana Farmasi, Universitas Katolik Widya Mandala Surabaya, Surabaya.
- Som, I., Kashish, B., Mohd. Yasir. 2015, Status of Surfactants as Penetration Enhancers in Transdermal Drug Delivery, *Journal of Pharmacy and Bioallied Sciences*, **4(1)**: 2-9.
- Sunarjono. 2003, *Fisiologi Tanaman Budidaya*, UI Press, Jakarta.

- Suppakul, P. 2006, ‘Plasticizer and Reactive Humidity Effects on Mechanical Properties of Cassava Flour Films’ Department of Packaging Technology, Faculty of Agro-Industry, Kasetsart University, Bangkok, Thailand.
- Suwertayasa, Widdhi, dan Hosea, 2013, Uji Efek Antipiretik Ekstrak Etanol Daun Tembelekan (*Lantana Camara L.*) Pada Tikus Putih Jantan Galur Wistar, Unsrat, Manado.
- Syarifah, L. 2010, ‘Efek Antipiretik Ekstrak Herba Meniran (*Phyllanthus niruri L.*) Terhadap Tikus Putih (*Rattus norvegicus*) Dengan Demam Yang Diinduksi Vaksin DPT’, Skripsi, Fakultas Kedokteran Universitas Sebelas Maret Surakarta, Solo.
- Sweetman, S.C. 2008, *Martindale: The Complete Drug Reference*, 36<sup>th</sup> ed, London: The Pharmaceutical Press, pp 8-10.
- Tersono dan Lukas, A. 2008, *Tanaman Obat dan Jus Untuk Mengatasi Penyakit Jantung, Hipertensi, Kolesterol dan Stroke*, Agromedia Pustaka, Jakarta.
- Tjitrosoepomo, G. 2010, *Taksonomi Tumbuhan Spermatophyta*, Gajah Mada University Press, Yogyakarta.
- Trommer, H. and Naubert R.H.H. 2006, Overcoming The Stratum Korneum: The Modulation of Skin Penetration, *Skin Pharmacol Physiol*, **19**: 106-21.
- Walters, A.K. 2002, *Dermatological and Transdermal Formulations*, Marcel Dekker Inc., New York.
- Walters, K. A. dan Brain, K.R. 2009, Topical and Transdermal Delivery, in Gibson, M., *Pharmaceutical Preformulation and Formulation, Second Edition*, Informa Healthcare, New York, pp 475-516.
- Williams, A.C. 2003, Transdermal and Topical Drug Delivery From Theory to Clinical Practice, *Pharmaceutical Press*, London, pp. 2-10, 180-18
- Williams, A.C. and Barry, B.W. 2004, Penetration Enhancers, *Advanced Drug Delivery Review*. **56**: 603–618.
- Wirayawan, I G.A. 2015, ‘Efek Ekstrak Bawang Merah (*Allium ascalonicum* L.) terhadap Perubahan Suhu Tubuh pada Tikus Putih yang Mengalami Demam’, Skripsi, Sarjana Keperawatan, Univeritas Udayana. Denpasar .

- Wyatt, E., Sutter, S.H. and Drake, L.A., 2001, 'Dermatology Pharmacology', in Hardman, J.G., Limbird, L.E., Gilman, A.G., *Goodman and Gilman's Textbook of The Pharmacological Basis of Therapeutics*, 10<sup>th</sup> ed., New York : McGraw-Hill, pp 1797
- Venkatraman, S., Davar, N., Chester, A., and Kleiner, L. 2002, "An Overvieew of Controlled Release System", in Wise, D.L., *Handbook of Pharmaceutical Controlled Release Technology*, New York : Marcel Dekker, Inc., pp 445-522.
- Zainuddin, M. 2000, *Metodologi Penelitian*, Fakultas Farmasi Universitas Airlangga, Surabaya, hal. 52-54.