

## **BAB V**

### **SIMPULAN**

#### **5.1. Simpulan**

Konsentrasi matriks etil selulosa dapat mempengaruhi pelepasan tablet lepas lambat metformin hidroklorida dengan mekanisme pelepasan difusi dan erosi, pada penelitian ini mekanisme pelepasan lebih dominan erosi. Sedangkan kinetika pelepasan mengikuti orde nol. Semakin tinggi konsentrasi etil selulosa maka semakin rendah jumlah % obat terlepas.

#### **5.2. Alur Penelitian Selanjutnya**

Dapat dilakukan penelitian lebih lanjut terhadap pelepasan sediaan tablet lepas lambat metformin hidroklorida sesuai rancangan penelitian yakni hingga 12 jam dengan penambahan *modified release* yang dapat menghambat pelepasan obat. Kemudian, perlu dilakukan penelitian parameter farmakokinetik sediaan lepas lambat metformin hidroklorida dan dicari korelasi *in vivo-in vitro*. Selain itu, dapat juga dilakukan penelitian menggunakan bahan aktif lain yang memenuhi kriteria untuk dibuat sediaan lepas lambat dengan menggunakan matriks etil selulosa, baik digunakan tunggal maupun kombinasi dengan matriks lain.

## DAFTAR PUSTAKA

Ansel, H.C., 1989. **Pengantar Bentuk Sediaan Farmasi**. (Ibrahim, F., penerjemah), 4<sup>th</sup> ed., UI Press. Jakarta, pp. 118-120, 144, 148, 247-299.

Banakar, U.V., 1992. **Pharmaceutical Dissolution Testing**, Marcel Dekker, Inc., New York, pp. 19-26, 322-330.

Bandelin, F.J. and Shangraw, R.F., 1989. Compressed tablet by wet granulation. In: Lieberman, H.A., Lachman, L., Schwartz, J.B. (Eds.), **Pharmaceutical Dosage Forms**, Volume 1, Marcel Dekker, Inc., New York, pp. 148-152.

Banker, G.S. and Anderson, N.R., 1986. Tablet. In: Lachman, L., Lieberman, H.A., Kanig, J.L. (Eds.), **The Theory and Practice of Industrial Pharmacy**, 3<sup>rd</sup> ed., Lea and Febiger, Philadelphia, pp. 293-317.

Basaak, L., 2005. Studi pelepasan in vitro metformin HCl dari sistem matriks kombinasi etil selulosa dan bees wax dalam bentuk tablet lepas lambat, *Tesis Program Studi Ilmu Farmasi*, Bidang Ilmu Matematika dan Pengetahuan alam, Universitas Gajah Mada, Yogyakarta

Bhardwaj, T.R., Kanwar, M., Lal, R. and Gupta, A., 2000. Natural gum and modified natural gums as sustained release carriers, **Drugs Dev Ind Pharm**, **26**, 1025-1038.

Bravo, S.A., 2002. **In vitro Studies of Metformin HCl Controlled Release From Biopolymeric Matrices.**, National University of Rosario, Rosario, pp. 1-9.

**Cara Pembuatan Obat Yang Baik**, 2001. Badan Pengawas Obat dan Makanan. Jakarta, pp. 412-429.

Chang, R.K. and Robinson, J.R., 1990. Sustained drug release from tablets and particles through coating. In: Lieberman, H.A, Lachman, L., Schwartz, J.B. (Eds.), **Pharmaceutical Dosage Form: Tablets**, volume 3, 2<sup>nd</sup> ed., Marcel Dekker, Inc. New York, pp. 205-208.

Collett, J. and Moreton, C., 2002. Modified-release peroral dosage form. In: Aulton, M.E. (Ed.), **Pharmaceutics: The Science of Dosage Form Design**, 2<sup>nd</sup> ed., Churchill Livingstone, Edinburgh, pp. 289-302.

Colombo, P., Santi, P., Bettini, P., Brazel, C.S., Peppas, N.A., 2000. Drug release from swelling-controlled systems, In: Wise, D.L. (Ed.), **Handbook of Pharmaceutical Controlled Release Technology**, Marcel Dekker, Inc., New York, pp. 185-190.

**European Pharmacopoeia** 3<sup>rd</sup> ed., 1997. The Council of Europe, Strasbourg, p. 1487.

**Farmakope Indonesia III**, 1979. Departemen Kesehatan Republik Indonesia, Jakarta, pp. 6-8, 128, 338, 354, 591.

**Farmakope Indonesia IV**, 1995. Departemen Kesehatan Republik Indonesia, Jakarta, pp. 4, 783, 784, 999-1000.

Ganiswarna, S.G., 1995. **Farmakologi dan Terapi**, edisi 4, Gaya Baru, Jakarta, pp. 207-210, 218.

Gordon, R.E., Rosanske, T.W., Fonner, D.E., Anderson, N.R., Banker, G.S., 1990. Granulation technology and tablet characterization. In: Lieberman, H.A., Lachman, L., Schwartz, J.B. (Eds.), **Pharmaceutical Dosage Form: Tablet**, volume 2, 2<sup>nd</sup> ed., Marcel Dekker, Inc., New York, pp. 283-300, 321-336.

Green, J.H., 1996. A practical guide to analytical method validation. **Analytical Chemistry**, **23**, 305-309.

Higuchi, W.I., 1963. Mechanism of sustained action medication: theoretical analysis of rate of release of solid drugs disperse in solid matrices, **J. Pharm. Sci.**, **52**, 1145-1149.

Khan, K.A., 1975. The concept of dissolution efficiency, **J. Pharmacol.**, **27**, 48-49.

Kibbe, A.H., 2000. **Handbook of Pharmaceutical Excipients**, 3<sup>rd</sup> ed. The Pharmaceutical Press, London, pp. 73-76, 276-284, 305-307, 433-439, 555, 556.

Kruger, A., 2006. **Food Chemistry 3: Other Carbohydrate Gels**. Department of Horticulture & Food Technology, London, pp. 4-5.

Langenbuchner, F., 1972. Linearisation of dissolution rate curve by Weibull distribution, **J. Pharm. Pharmacol.**, **24**, 979-981.

Lapidus, H. and Lordi, N.G., 1968. Drug release from compressed hydrophobic matrices, **J. Pharm. Sci.**, **57**, 1292-1301.

Lowman, A.M. and Peppas, N.A., 1999. Hydrogels. In: Mathiowitz, E. (Ed.), **Encyclopedia of Controlled Drug Delivery**, volume 1, John Wiley & Sons, Inc., New York, pp. 405-406.

Martin, A., Swarbrick, J., Cammarata, A., 1993. **Farmasi Fisik: Dasar-Dasar Kimia Fisik dalam Ilmu Farmasetik**. (Yoshita, penerjemah). Universitas Indonesia Press, Jakarta, hal. 845-847.

Natalia, M.I., 2006. **Profil pelepasan *in vitro* metformin HCl dalam bentuk tablet lepas lambat dengan menggunakan matriks kombinasi *low methoxyl pectin* dan kalsium sulfat**, Skripsi Sarjana Farmasi, Universitas Katolik Widya Mandala, Surabaya.

Parrott, E.L., 1971, **Pharmaceutical Technology: Fundamental Pharmaceutics**, Burgess Publishing Company, Minneapolis, pp. 17-30, 80-86.

**Remington Pharmaceutical Sciences 23<sup>rd</sup> ed., 2005**. The Philadelphia College of Pharmacy and Science, Philadelphia, pp. 243-245.

Rolin, C., 1993. Pectin. In: Whistler, R.L. and Bemiller, J.N. (Eds.), **Industrial Gums: Polysaccharides and Their Derivatives**, 3<sup>rd</sup> ed., Academic Press, Inc., San Diego, pp. 257-288.

Shargel, L. and Yu, B.C., 1999. **Applied Biopharmaceutics and Pharmacokinetics**, 4<sup>th</sup> ed., McGraw-Hill, London, pp. 169-201.

Siregar, Ch.J.T., 1992. Proses validasi dan manufaktur sediaan tablet. In: Asyarie, S., Mar'u, U., Badruzzaman, S. (Eds.), **Prosiding Seminar Validasi di Industri Farmasi**, Jurusan Farmasi FMIPA, Institut Teknologi Bandung, pp. 26-41.

Sungthongjeen, S., Sriamornsak, P., Pitaksuteepong, T., Samsiri, A., Puttipipatkachorn, S., 2004. Effect of ethyl cellulose amount on drug release from matrix tablets. **AAPS Pharm, Sci, Tech.**, 5, 1-8.

Sweetman, S.C., 2005. **Martindale: The Extra Pharmacopoeia**, 34<sup>th</sup> ed. The Pharmaceutical Press, London, p. 32-34.

**US Pharmacopeia XXVIII**, 2005. US Pharmacopeial Conventions, Inc., Rockville, pp. 626-627, 2412-2415.

Voigt, R., 1995. Buku **Pelajaran Teknologi Farmasi**. (Soewandhi, S.M., penerjemah), 5<sup>th</sup> ed., Gajah Mada University Press, Yogyakarta, pp. 158, 165-173.

Wagner, J.G., 1971. **Biopharmaceutics and Relevant Pharmacokinetic**, Drug Intelligence Publications, Illinois, pp. 64-110.

