

DAFTAR PUSTAKA

- Abdalla, K.A., Kamoun, E.A., dan Maghraby, G.M.E., 2015. Optimization of the entrapment efficiency and release of ambroxol hydrochloride alginate beads. *Journal of Applied Pharmaceutical Science*, .
- Allen, L.V., Popovich, N.G., dan Ansel, H.C., 2011. *Ansels Pharmaceutical Dosage Forms and Drug Delivery Systems" 9TH EDITION*. Lipincot Wiliams & Wilkins,2011.
- Andishmand, H., Tabibiazar, M., Mohammadifar, M.A., dan Hamishehkar, H., 2017. Pectin-zinc-chitosan-polyethylene glycol colloidal nano-suspension as a food grade carrier for colon targeted delivery of resveratrol. *International Journal of Biological Macromolecules*, **97**: 16–22.
- Anonim, 1995. *ICH Topic Q 2 (R1) Validation of Analytical Procedures: Text and Methodology*. International Conference on Harmonization.
- Anonim, 1998. *AOAC Peer-Verified Methods Program, Manual on Policies and Procedures*. AOAC INTERNATIONAL.
- Anonim, 2010. *2011 USP 34 NF 29 3-Volume Set*, 2011 NF29 edition. ed. The United States Pharmacopeial Convention.
- Bhatia, S., 2016. *Natural Polymer Drug Delivery Systems: Nanoparticles, Plants, and Algae*, 1st ed. 2016 edition. ed. Springer, New York, NY.
- Bilati, U., Allémann, E., dan Doelker, E., 2005. Nanoprecipitation versus emulsion-based techniques for the encapsulation of proteins into biodegradable nanoparticles and process-related stability issues. *AAPS PharmSciTech*, **6**: E594-604.
- Birch, N.P. dan Schiffman, J.D., 2014. Characterization of self-assembled polyelectrolyte complex nanoparticles formed from chitosan and pectin. *Langmuir: the ACS journal of surfaces and colloids*, **30**: 3441–3447.
- Bischoff, J., 2009. Progenitor cells in infantile hemangioma. *The Journal of craniofacial surgery*, **20**: 695–697.
- Bolton, S. dan Bon, C., 2003. *Pharmaceutical Statistics: Practical and Clinical Applications, Revised and Expanded*, 4 edition. ed. CRC Press, New York.
- Boscolo, E. dan Bischoff, J., 2009. Vasculogenesis in Infantile Hemangioma. *Angiogenesis*, **12**: 197–207.
- Boye, E. dan Olsen, B.R., 2009. Signaling mechanisms in infantile hemangioma. *Current Opinion in Hematology*, **16**: 202–208.

- Cai, X.J., Mesquida, P., dan Jones, S.A., 2016. Investigating the ability of nanoparticle-loaded hydroxypropyl methylcellulose and xanthan gum gels to enhance drug penetration into the skin. *International Journal of Pharmaceutics*, **513**: 302–308.
- Callahan, A.B. dan Yoon, M.K., 2012. Infantile hemangiomas: A review. *Saudi Journal of Ophthalmology*, **26**: 283–291.
- Calvo, M., Garcia-Millán, C., Villegas, C., Fueyo-Casado, A., dan Burón, I., 2013. Topical timolol for infantile hemangioma of the eyelid. *International Journal of Dermatology*, **52**: 603–604.
- Chan, H., McKay, C., Adams, S., dan Wargon, O., 2013. RCT of timolol maleate gel for superficial infantile hemangiomas in 5- to 24-week-olds. *Pediatrics*, **131**: e1739-1747.
- Chen, Z.G., Zheng, J.W., Yuan, M.L., Zhang, L., dan Yuan, W.E., 2015. A novel topical nano-propranolol for treatment of infantile hemangiomas. *Nanomedicine: Nanotechnology, Biology, and Medicine*, **11**: 1109–1115.
- Coimbra, P., Ferreira, P., de Sousa, H.C., Batista, P., Rodrigues, M.A., Correia, I.J., dkk., 2011. Preparation and chemical and biological characterization of a pectin/chitosan polyelectrolyte complex scaffold for possible bone tissue engineering applications. *International Journal of Biological Macromolecules*, **48**: 112–118.
- Cook, W., Quinn, M.E., dan Sheskey, P.J., 2009. Pectin, dalam: Rowe, R.C., Sheskey, P.J., dan Quinn, M.E. (Editor), *Handbook of Pharmaceutical Excipients*. Pharmaceutical Press, London.
- Crucho, C.I.C. dan Barros, M.T., 2017. Polymeric nanoparticles: A study on the preparation variables and characterization methods. *Materials Science & Engineering. C, Materials for Biological Applications*, **80**: 771–784.
- Danaei, M., Dehghankhold, M., Ataei, S., Hasanzadeh Davarani, F., Javanmard, R., Dokhani, A., dkk., 2018. Impact of Particle Size and Polydispersity Index on the Clinical Applications of Lipidic Nanocarrier Systems. *Pharmaceutics*, **10**: .
- Danarti, R., Ariwibowo, L., Radiono, S., dan Budiyanoto, A., 2016. Topical Timolol Maleate 0.5% for Infantile Hemangioma: Its Effectiveness Compared to Ultrapotent Topical Corticosteroids - A Single-Center Experience of 278 Cases. *Dermatology (Basel, Switzerland)*, **232**: 566–571.
- Darrow, D.H., Greene, A.K., Mancini, A.J., dan Nopper, A.J., 2015. Diagnosis and Management of Infantile Hemangioma. *Pediatrics*, **136**: e1060-1104.

- Dash, S., Murthy, P.N., Nath, L., dan Chowdhury, P., 2010. Kinetic modeling on drug release from controlled drug delivery systems. *Acta Poloniae Pharmaceutica*, **67**: 217–223.
- Duarah, S., Durai, R.D., dan Narayanan, V.B., 2017. Nanoparticle-in-gel system for delivery of vitamin C for topical application. *Drug Delivery and Translational Research*, **7**: 750–760.
- El-Laithy, H.M., 2009. Novel transdermal delivery of Timolol maleate using sugar esters: Preclinical and clinical studies. *European Journal of Pharmaceutics and Biopharmaceutics*, **72**: 239–245.
- Fan, W., Yan, W., Xu, Z., dan Ni, H., 2012. Formation mechanism of monodisperse, low molecular weight chitosan nanoparticles by ionic gelation technique. *Colloids and Surfaces. B, Biointerfaces*, **90**: 21–27.
- Felter, S.P., Carr, A.N., Zhu, T., Kirsch, T., dan Niu, G., 2017. Safety evaluation for ingredients used in baby care products: Consideration of diaper rash. *Regulatory toxicology and pharmacology: RTP*, **90**: 214–221.
- Feranisa, A., Arimurni, D.A., Ismail, H., Martien, R., dan Sismindari, S., 2015. Formulation of Medium Viscosity Chitosan-Pectin –MJ Protein Nanoparticles Conjugated with Anti-Ep-CAM and Its Cytotoxicity Against T47D Breast Cancer Cell Lines. *Indonesian Journal of Biotechnology*, **20**: 1–10.
- Frieden, I.J., Eichenfield, L.F., Esterly, N.B., Geronemus, R., dan Mallory, S.B., 1997. Guidelines of care for hemangiomas of infancy. American Academy of Dermatology Guidelines/Outcomes Committee. *Journal of the American Academy of Dermatology*, **37**: 631–637.
- Frommelt, P., Juern, A., Siegel, D., Holland, K., Seefeldt, M., Yu, J., dkk., 2016. Adverse Events in Young and Preterm Infants Receiving Topical Timolol for Infantile Hemangioma. *Pediatric Dermatology*, **33**: 405–414.
- Goyal, R., Macri, L.K., Kaplan, H.M., dan Kohn, J., 2016. Nanoparticles and nanofibers for topical drug delivery. *Journal of Controlled Release*, , SI: North America Part II **240**: 77–92.
- Grabnar, P.A. dan Kristl, J., 2010. Physicochemical characterization of protein-loaded pectin-chitosan nanoparticles prepared by polyelectrolyte complexation. *Die Pharmazie*, **65**: 851–852.
- Grabnar, P.A. dan Kristl, J., 2011. The manufacturing techniques of drug-loaded polymeric nanoparticles from preformed polymers. *Journal of Microencapsulation*, **28**: 323–335.

- Grenha, A., Gomes, M.E., Rodrigues, M., Santo, V.E., Mano, J.F., Neves, N.M., dkk., 2010. Development of new chitosan/carrageenan nanoparticles for drug delivery applications. *Journal of Biomedical Materials Research. Part A*, **92**: 1265–1272.
- Gupta, R.B., 2006. Fundamentals of Drug Nanoparticles, dalam: Gupta, R.B. dan Kompella, U.B. (Editor), *Nanoparticle Technology for Drug Delivery*. Taylor & Francis, New York, hal. 1–18.
- Honary, S. dan Zahir, F., 2013. Effect of Zeta Potential on the Properties of Nano-Drug Delivery Systems - A Review (Part 1). *Tropical Journal of Pharmaceutical Research*, **12**: 255-264–264.
- Ilka, R., Mohseni, M., Kianirad, M., Naseripour, M., Ashtari, K., dan Mehravi, B., 2018. Nanogel-based natural polymers as smart carriers for the controlled delivery of Timolol Maleate through the cornea for glaucoma. *International Journal of Biological Macromolecules*, **109**: 955–962.
- Iswandana, R., Anwar, E., dan Jufri, M., 2013. Formulasi Nanopartikel Verapamil Hidroklorida dari Kitosan dan Natrium Tripolifosfat dengan Metode Gelasi Ionik. *Jurnal Farmasi Indonesia*, **6**: 201–210.
- Jansson, D., 2010. Development and characterisation of chitosan-plasmid DNA nanoparticles. *Master of Science Thesis*, .
- Jonassen, H., Treves, A., Kjøniksen, A.-L., Smistad, G., dan Hiorth, M., 2013. Preparation of ionically cross-linked pectin nanoparticles in the presence of chlorides of divalent and monovalent cations. *Biomacromolecules*, **14**: 3523–3531.
- Jones, D.S., 2009. Chitosan, dalam: Rowe, R.C., Sheskey, P.J., dan Quinn, M.E. (Editor), *Handbook of Pharmaceutical Excipients*. Pharmaceutical Press, London.
- Katas, H., Thian Sian, T., dan Abdul Ghaf, M., 2017. Topical Temperature-sensitive Gel Containing DsiRNA-chitosan Nanoparticles for Potential Treatment of Skin Cancer. *Trends in Medical Research*, **12**: 1–13.
- Kunjachan, S., Jose, S., dan Lammers, T., 2014. Understanding the mechanism of ionic gelation for synthesis of chitosan nanoparticles using qualitative techniques. *Asian Journal of Pharmaceutics (AJP): Free full text articles from Asian J Pharm*, **4**: .
- Kunzi-Rapp, K., 2012. Topical Propranolol Therapy for Infantile Hemangiomas: Topical Propranolol for Infantile Hemangiomas. *Pediatric Dermatology*, **29**: 154–159.

- Léauté-Labrèze, C., Harper, J.I., dan Hoeger, P.H., 2017. Infantile haemangioma. *The Lancet*, **390**: 85–94.
- Li, X., Kong, X., Shi, S., Zheng, X., Guo, G., Wei, Y., dkk., 2008. Preparation of alginate coated chitosan microparticles for vaccine delivery. *BMC biotechnology*, **8**: 89.
- Lv, Y., He, H., Qi, J., Lu, Y., Zhao, W., Dong, X., dkk., 2018. Visual validation of the measurement of entrapment efficiency of drug nanocarriers. *International Journal of Pharmaceutics*, **547**: 395–403.
- Maciel, V.B.V., Yoshida, C.M.P., dan Franco, T.T., 2015. Chitosan/pectin polyelectrolyte complex as a pH indicator. *Carbohydrate Polymers*, **132**: 537–545.
- Maciel, V.B.V., Yoshida, C.M.P., Pereira, S.M.S.S., Goycoolea, F.M., dan Franco, T.T., 2017. Electrostatic Self-Assembled Chitosan-Pectin Nano- and Microparticles for Insulin Delivery. *Molecules (Basel, Switzerland)*, **22**: .
- Masarudin, M.J., Cutts, S.M., Evison, B.J., Phillips, D.R., dan Pigram, P.J., 2015. Factors determining the stability, size distribution, and cellular accumulation of small, monodisperse chitosan nanoparticles as candidate vectors for anticancer drug delivery: application to the passive encapsulation of [14C]-doxorubicin. *Nanotechnology, Science and Applications*, **8**: 67–80.
- Melo, N.F.S., Campos, E.V.R., Paula, E.D., Rosa, A.H., dan Fraceto, L.F., 2013. Factorial design and characterization studies for articaine hydrochloride loaded alginate/chitosan nanoparticles. *Journal of Colloid Science and Biotechnology*, 146–152.
- Merino-Bohórquez, V., Casas, M., Caracuel, F., Cameán, M., Fernández-Anguita, M.J., Ramírez-Soto, G., dkk., 2015. Physicochemical stability of a new topical timolol 0.5% gel formulation for the treatment of infant hemangioma. *Pharmaceutical Development and Technology*, **20**: 562–569.
- Mishra, R.K., Banthia, A.K., dan Majeed, A.B.A., 2012. Pectin based formulations for biomedical applications: A review. *Asian Journal of Pharmaceutical and Clinical Research*, **5**: 1–7.
- Moffat, A.C., Osselton, M.D., dan Widdop, B. (Editor), 2011. *Clarke's Analysis of Drugs and Poisons, 4th Edition*, 4 Revised edition. ed. Pharmaceutical Press, London ; Chicago.
- Morris, G., Kök, S., Harding, S., dan Adams, G., 2010. Polysaccharide drug delivery systems based on pectin and chitosan. *Biotechnology & Genetic Engineering Reviews*, **27**: 257–284.

- Morsi, N.M., Aboelwafa, A.A., dan Dawoud, M.H.S., 2016. Improved bioavailability of timolol maleate via transdermal transfersomal gel: Statistical optimization, characterization, and pharmacokinetic assessment. *Journal of Advanced Research*, **7**: 691–701.
- Mukhopadhyay, P., Chakraborty, S., Bhattacharya, S., Mishra, R., dan Kundu, P.P., 2015. pH-sensitive chitosan/alginate core-shell nanoparticles for efficient and safe oral insulin delivery. *International Journal of Biological Macromolecules*, **72**: 640–648.
- Nagpal, K., Singh, S.K., dan Mishra, D.N., 2010. Chitosan nanoparticles: a promising system in novel drug delivery. *Chemical & Pharmaceutical Bulletin*, **58**: 1423–1430.
- Namburi, B.V.N., Yadav, H.K.S., S, H., Ahmed, A., Sureddy, V.L., dan Shivakumar, H.G., 2014. Formulation and Evaluation of Polymeric Nanoparticulate Gel for Topical Delivery. *International Journal of Polymeric Materials and Polymeric Biomaterials*, **63**: 476–485.
- Nava, G., Piñón, E., Mendoza, L., Mendoza, N., Quintanar, D., dan Ganem, A., 2011. Formulation and in Vitro, ex Vivo and in Vivo Evaluation of Elastic Liposomes for Transdermal Delivery of Ketorolac Tromethamine. *Pharmaceutics*, **3**: 954–970.
- Oliveira, G.F., Ferrari, P.C., Carvalho, L.Q., dan Evangelista, R.C., 2010. Chitosan–pectin multiparticulate systems associated with enteric polymers for colonic drug delivery. *Carbohydrate Polymers*, **82**: 1004–1009.
- Pal, S.L., Jana, U., Manna, P.K., Mohanta, G.P., dan Manavalan, R., 2011. Nanoparticle: An overview of preparation and characterization. *Journal of Applied Pharmaceutical Science*, **1**: 228–234.
- Pathak, Y. dan Thassu, D. (Editor), 2016. *Drug Delivery Nanoparticles Formulation and Characterization*, 1 edition. ed. CRC Press.
- Patil, J.S., Marapur, S.C., Gurav, P.B., dan Banagar, A.V., 2015. Iontropic Gelation and Polyelectrolyte Complexation Technique: Novel approach for Drug Encapsulation, dalam: Mishra, M. (Editor), *Handbook of Encapsulation and Controlled Release*. CRC Press, hal. 273–291.
- Pawar, A.P., Gadhe, A.R., Venkatachalam, P., Sher, P., dan Mahadik, K.R., 2008. Effect of core and surface cross-linking on the entrapment of metronidazole in pectin beads. *Acta Pharmaceutica (Zagreb, Croatia)*, **58**: 78–85.
- Pertiwi, D., Martien, R., Sismindari, -, dan Ismail, H., 2018. Formulation of nanoparticles ribosome inactivating proteins from *Mirabilis jalapa* L. (RIP MJ) conjugated AntiEpCAM antibody using low chain chitosan-pectin and

cytotoxic activity against breast cancer cell line. *Pakistan Journal of Pharmaceutical Sciences*, **31**: 379–384.

Poland, C.A., Read, S.A.K., Varet, J., Carse, G., Christensen, F.M., dan Hankin, S.M., 2013. *Dermal Absorption of Nanomaterials Part of the "Better Control of Nano" Initiative 2012-2015*. The Danish Environmental Protection Agency, Denmark.

Quintard, B., Gana, K., Constant, A., Quintric, C., Taïeb, A., dan Léauté-Labrèze, C., 2013. Social isolation in parents of children with hemangiomas: effects of coping styles and emotional distress. *Psychology, Health & Medicine*, **18**: 698–704.

Rathore, K.S., Nema, D.R.K., dan Sisodia, D.S.S., 2010. Preparation and Characterization of Timolol Maleate Ocular Films. *International Journal of PharmTech Research*, **2**: 1995–2000.

Ro, J., Kim, Y., Kim, H., Park, K., Lee, K.-E., Khadka, P., dkk., 2015. Pectin Micro- and Nano-capsules of Retinyl Palmitate as Cosmeceutical Carriers for Stabilized Skin Transport. *The Korean Journal of Physiology & Pharmacology: Official Journal of the Korean Physiological Society and the Korean Society of Pharmacology*, **19**: 59–64.

Rogers, T.L., 2009. Hypromellose, dalam: Rowe, R.C., Sheskey, P.J., dan Quinn, M.E. (Editor), *Handbook of Pharmaceutical Excipients*. Pharmaceutical Press, London.

Senyigit, T., Sonvico, F., Barbieri, S., Ozer, O., Santi, P., dan Colombo, P., 2010. Lecithin/chitosan nanoparticles of clobetasol-17-propionate capable of accumulation in pig skin. *Journal of Controlled Release: Official Journal of the Controlled Release Society*, **142**: 368–373.

Sethuraman, G., Yenamandra, V.K., dan Gupta, V., 2014. Management of Infantile Hemangiomas: Current Trends. *Journal of Cutaneous and Aesthetic Surgery*, **7**: 75–85.

Setyawan, E.I., Setyowati, E.P., Rohman, A., dan Nugroho, A.K., 2018. Central composite design for optimizing extraction of EGCG from green tea leaf (*Camellia sinensis* L.). *International Journal of Applied Pharmaceutics*, 211–216.

Sharma, R., Ahuja, M., dan Kaur, H., 2012. Thiolated pectin nanoparticles: Preparation, characterization and ex vivo corneal permeation study. *Carbohydrate Polymers*, **87**: 1606–1610.

- Shen, C., Shen, B., Liu, X., dan Yuan, H., 2018. Nanosuspensions based gel as delivery system of nitrofurazone for enhanced dermal bioavailability. *Journal of Drug Delivery Science and Technology*, **43**: 1–11.
- Shiyan, S., Hertiani, T., Martien, R., dan Nugroho, A.K., 2018. Optimization of a novel kinetic-assisted infundation of white tea (*Camellia sinensis*) using central composite design. *International Journal of Applied Pharmaceutics*, 259–267.
- Shokry, M., Hathout, R.M., dan Mansour, S., 2018. Exploring gelatin nanoparticles as novel nanocarriers for Timolol Maleate: Augmented in-vivo efficacy and safe histological profile. *International Journal of Pharmaceutics*, **545**: 229–239.
- Siafaka, P.I., Titopoulou, A., Koukaras, E.N., Kostoglou, M., Koutris, E., Karavas, E., dkk., 2015. Chitosan derivatives as effective nanocarriers for ocular release of timolol drug. *International Journal of Pharmaceutics*, **495**: 249–264.
- Siddique, M.I., Katas, H., Amin, M.C.I.M., Ng, S.-F., Zulfakar, M.H., dan Jamil, A., 2016. In-vivo dermal pharmacokinetics, efficacy, and safety of skin targeting nanoparticles for corticosteroid treatment of atopic dermatitis. *International Journal of Pharmaceutics*, **507**: 72–82.
- Stamatas, G.N., Nikolovski, J., Mack, M.C., dan Kollias, N., 2011. Infant skin physiology and development during the first years of life: a review of recent findings based on in vivo studies. *International Journal of Cosmetic Science*, **33**: 17–24.
- Wang, H., Yang, B., dan Sun, H., 2017. Pectin-Chitosan Polyelectrolyte Complex Nanoparticles for Encapsulation and Controlled Release of Nisin. *American Journal of Polymer Science and Technology*, **3**: 82.
- Yang, X., Trinh, H.M., Agrahari, V., Sheng, Y., Pal, D., dan Mitra, A.K., 2016. Nanoparticle-Based Topical Ophthalmic Gel Formulation for Sustained Release of Hydrocortisone Butyrate. *AAPS PharmSciTech*, **17**: 294–306.
- Zaki, S.S.O., Ibrahim, M.N., dan Katas, H., 2015. Particle Size Affects Concentration-Dependent Cytotoxicity of Chitosan Nanoparticles towards Mouse Hematopoietic Stem Cells. *Journal of Nanotechnology*, .
- Zayed, G.M. dan El-feky, G.S., 2019. Growth factor loaded functionalized gold nanoparticles as potential targeted treatment for acute renal failure. *International Journal of Applied Pharmaceutics*, 174–185.
- Zhang, H., Wu, S., Tao, Y., Zang, L., dan Su, Z., 2010. Preparation and Characterization of Water-Soluble Chitosan Nanoparticles as Protein

Delivery System', , *Research article, Journal of Nanomaterials*. URL: <https://www.hindawi.com/journals/jnm/2010/898910/> (diakses tanggal 12/12/2018).

- Zhang, Y., Huo, M., Zhou, J., Zou, A., Li, W., Yao, C., dkk., 2010. DDSolver: An Add-In Program for Modeling and Comparison of Drug Dissolution Profiles. *The AAPS Journal*, **12**: 263–271.
- Zhang, Y., Zhang, J., Chen, M., Gong, H., Thamphiwatana, S., Eckmann, L., dkk., 2016. A Bioadhesive Nanoparticle-Hydrogel Hybrid System for Localized Antimicrobial Drug Delivery. *ACS applied materials & interfaces*, **8**: 18367–18374.
- Zhang, Z., Tsai, P.-C., Ramezanli, T., dan Michniak-Kohn, B.B., 2013. Polymeric nanoparticles-based topical delivery systems for the treatment of dermatological diseases. *Wiley Interdisciplinary Reviews. Nanomedicine and Nanobiotechnology*, **5**: 205–218.
- Zhao, R., Li, J., Wang, J., Yin, Z., Zhu, Y., dan Liu, W., 2017. Development of Timolol-Loaded Galactosylated Chitosan Nanoparticles and Evaluation of Their Potential for Ocular Drug Delivery. *AAPS PharmSciTech*, **18**: 997–1008.
- Zheng, J.W., Zhang, L., Zhou, Q., Mai, H.M., Wang, Y.A., Fan, X.D., dkk., 2013. A practical guide to treatment of infantile hemangiomas of the head and neck. *International Journal of Clinical and Experimental Medicine*, **6**: 851–860.