

DAFTAR PUSTAKA

- Abolmaali, S.S., Tamaddon, A.M., Farvadi, F.S., Daneshamuz, S., & Moghimi, H., 2011, Pharmaceutical Nanoemulsions and Their Potential Topical and Transdermal Applications, *Iran. J. Pharm. Sci.*, **7** (3), 139-150 cit. Sengputa, P., & Chatterjee, B., 2017, Potential and Future Scope of Nanoemulgel Formulation for Topical Delivery of Lipophilic Drugs, *Int J Pharm*, **526** (1-2), 353-365.
- Ashara, K.C., Paun, J.S., Soniwala, M.M., Chavada, J.R., & Mori, N.M., 2014, Micro-Emulsion Based Emulgel: A Novel Topical Drug Delivery System, *Asian Pac J Trop Dis*, **4** (Suppl 1), S27-S32.
- Astuti, I.Y., Marchaban, Martien, R., Nugroho, A.E., 2017, Design and Optimization of Self Nano-Emulsifying Drug Delivery System Containing a New Anti-inflammatory Agent Pentagamavunon-0. *Indones. J. Chem.*, **17** (3), 365 – 375.
- Ayunin, K., 2017, Formulasi dan Uji Pelepasan Meloxicam dalam Sistem Nanoemulsi Menggunakan Kombinasi Fase Minyak Palm Oil dan Virgin Coconut Oil, *Skripsi*, Universitas Islam Negeri Maulana Malik Ibrahim, Malang.
- Azeem, A., Ahmad, F.J., Khar, R.K., Talegaonkar, S., 2009, Nanocarrier for the transdermal delivery of an antiparkinsonian drug. *AAPS PharmSciTech*, **10** (4), 1093–1103.
- Azeem, A., Rizwan, M., Ahmad, F.J., Iqbal, Z., Khar, R.K., Aqil, M., & Talegaonkar, S., 2009, Nanoemulsion Components Screening and Selection: a Technical Note, *AAPS PharmSciTech*, **10** (1), 69-76.
- Baboota, S., Shakeel, F., Ahuja, A., Ali, J., & Shafiq, S., 2007, Design, Development and Evaluation of Novel Nanoemulsion Formulations for Transdermal Potentiation of Celecoxib, **57** (3), 315-332.
- Baibhav, J., Gurpreet, S., C, A.R., Seema, S., Vikas, S., 2011, Emulgel: A Comprehensive Review on the Recent Advances in Topical Drug Delivery, *IRJP*, **2** (11), 66-70.
- Basera, K., Bhatt, G., Kothiyal, P., & Gupta, P., 2015, Nanoemulgel: A Novel Formulation Approach for Topical Delivery of Hydrophobic Drugs, *WJPPS*, **4** (10), 1871-1886.
- Bologna, J. L., 1995, Aging Skin, *Am. J. Med.*, **98** (1), S99-S103.
- Boonme, P., & Yotsawimonwat, S., 2011, Anti-ageing Microemulsions and Nanoemulsions, *H&PC Today*, **6** (1), 42-47.

- Cable, C.G., 2009, Oleic Acid, dalam Rowe, R. C., Sheskey, P. J. & Owen S.C., (Eds.), *Handbook of Pharmaceutical Excipients*, Edisi 6, 466-468, Pharmaceutical Press and American Pharmacist Association, London.
- Calderó, G., García-Celma, M.J., & Solans, C., 2011, Formation of Polymer Nanoemulsions by A Low-energy Method and Their Use for Nanoparticle Preparation, *J. Colloid Interface Sci.*, **353** (2), 406-411.
- Chellapa, P., Mohamed, A.T., Keleb, E.I., Elmahgoubi, A., Eid, A.M., Issa, Y.S., & Elmarzugi, N.A., 2015, Nanoemulsion and Nanoemulgel as a Topical Formulation, *IOSR Journal of Pharmacy*, **5** (10), 43-47.
- Choulis, N.H., 2011, Miscellaneous drugs, materials, medical devices, and techniques, *Side Effects of Drugs Annual*, **33** (49), 1009 – 1029.
- Chu, D.H., 2012, Development and Structure of Skin, dalam Goldsmith, L.A., Katz, S.I., Gilchrest, B.A., Paller, A.S., Leffell, D.J., & Wolff, K., (Eds.), 2012, *Fitzpatrick's Dermatology in General Medicine*, Edisi 8, 58-68, McGraw Hill Medical, New York.
- Cosmetic Ingredient Review Panel, 1988, Final Report on the Safety Assessment of DMDM Hydantoin, *J Am Coll Toxicol*, **7** (3), 245-277.
- Damayanti, H., Wikarsa, S., & Jafar, G., 2019, Formulasi Nanoemulgel Ekstrak Kulit Manggis (*Garcinia Mangostana L.*), *Jurnal Riset Kefarmasian Indonesia*, **1** (3), 2019.
- Debnath, S., Satyanarayanaand, & Kumar, G.V., 2010, Nanoemulsion – A Method to Improve the Solubility of Lipophilic Drugs, *Pharmanest*, **2** (2-3), 72-83.
- Departemen Kesehatan Republik Indonesia, 1995, *Farmakope Indonesia*, Edisi 4, 1039, Jakarta: Direktorat Jendral Pengawasan Obat dan Makanan, Jakarta.
- Dhawan, B., Aggarwal, G., & Harikumar, S.L., 2014, Enhanced Transdermal Permeability of Piroxicam Through Novel Nanoemulgel Formulation, *Int J Pharm Investig.*, **4** (2), 65 – 76.
- Dinis, T.C., Maderia, V.M., dan Almeida, L.M., 1994, Action of Phenolic Derivates (Acetoaminophen, Salicylate and 5-Aminosalicylate) as Inhibitors of Membrane Lipid Peroxidation and as Peroxyl Radical Scavengers, *Arch. Biochem. Biophys.*, **315** (1), 161–169.
- Draganoiu, E., Rajabi-Siahboomi, A., & Tiwari, S., 2009, Carbomer dalam Rowe, R. C., Sheskey, P. J. & Owen S.C., (Eds.), *Handbook of Pharmaceutical Excipients*, Edisi 6, 110-114, Pharmaceutical Press and American Pharmacist Association, London.
- Drais, H.K., & Hussein, A.A., 2017, Formulation Characterization and Evaluation of Meloxicam Nanoemulgel to be Used Topically, *Iraqi J Pharm Sci*, **26** (1), 9-16.

- Dubash, D., & Shah, U., 2009, Water, dalam Rowe, R. C., Sheskey, P. J. & Owen S.C., (Eds.), *Handbook of Pharmaceutic Excipients*, Edisi 6, 766-770, Pharmaceutical Press and American Pharmacist Association, London.
- Ee, S.L., Duan, X., Liew, J., & Nguyen, Q.D., 2008, Droplet Size and Stability of Nano-emulsions Produced by the Temperature Phase Inversion Method, *The Chem Eng J*, **140** (1-3), 626-631.
- Ernoviya, E., Masfria, M., Sinaga, K.R., 2018, Optimization and Evaluation of Topical Ketoconazole Nanoemulsion, *Asian J Pharm Clin Res*, **11**(5), 143-146.
- Farida, E., 2018, Formulasi dan Evaluasi Sediaan Nanoemulgel Piroksikam Menggunakan Variasi Konsentrasi Surfaktan Tween 80 dan Kosurfaktan PEG 400, *Skripsi*, Universitas Sumatra Utara, Medan.
- Farijani, N., 2016, Metode Baru Sintesis Tetrahidropentagamavunon-5 dan Tetrahidroheksagamavunon-5 serta Formulasi dan Uji aktivitas Antioksidan dalam Sediaan Krim dan Gel, *Tesis*, Fakultas Farmasi, Universitas Gadjah Mada, Yogyakarta.
- Febriana, H.I., 2016, Formulasi Gel Tetrahidropentagamavunon-0 (THPGV-0) dan Uji Iritasi Akut Dermal pada Kelinci serta Penentuan Nilai SPF Secara In Vitro, *Skripsi*, Universitas Gadjah Mada, Yogyakarta.
- Ganceviciene, R., Liakou, A.I., Theodoridis, A., Makrantonaki, E., & Zouboulis, C.C., 2012, Skin Anti-aging Strategies, *Dermato-Endocrinology*, **4** (3), 308-319.
- Gilaberte, Y., Prieto-Torres, L., Patushenko, I., & Juarranz, Á, 2016, Chapter 1 - Anatomy and Function of the Skin, dalam Hamblin, M.R., Avci, P., & Prow, T.W., (Eds.), *Nanoscience in Dermatology*, Edisi 1, 1-14, Academic Press, London.
- Gohtani, S., & Prasert, W., 2014, Nano-Emulsions; Emulsification Using Low Energy Methods, *JJFE*, **15** (3), 119-130.
- Goskonda, S.R., 2009, Triethanolamine, dalam Rowe, R. C., Sheskey, P. J. & Owen S.C., (Eds.), *Handbook of Pharmaceutic Excipients*, Edisi 6, 745-755, Pharmaceutical Press and American Pharmacist Association, London.
- Gräbner, D., & Hoffman, H., 2017, Chapter 27 - Rheology of Cosmetic Formulations, dalam Sakamoto, K., Lochhead, R.Y., Maibach, H.I., & Yamashita, Y., (Eds.), *Cosmetic Science and Technology Theoretical Principles and Applications*, 471-488, Elsevier, Cambridge.
- Gupta, A., Eral, H.B., Hatton, T.A., & Doyle, P.S., 2016, Nanoemulsions: Formation, Properties, and Applications, *Soft Matter*, **12** (11), 2826-2841.
- Halliwell, B., & Whiteman, M., 1997, Antioxidant and Prooxidant Properties of Vitamin C, dalam Packer, L., & Fuchs, J., (Eds.), *Vitamin C in Health and Disease*, Marcel Decker Inc, New York.

- Hussain, A., Samad, A., Singh, S.K., Ahsan, M.N., Haque, M.W., Faruk, A., & Ahmed, F.J., 2016. Nanoemulsion gel-based topical delivery of an antifungal drug: in vitro activity and in vivo evaluation, *Drug Deliv*, **23** (2), 642–647.
- Imanto, T., Prasetyawan, R., Wikantyasning, E.R., 2019, Formulasi dan Karakterisasi Sediaan Nanoemulgel Serbuk Lidah Buaya (*Aloe Vera L.*), *Pharmacon*, **16** (1), 28-37.
- Jasmina, H., Džana, O., Alisa E., Edina V., & Ognjenka, R., 2017, Preparation of Nanoemulsions by High-Energy and Lowenergy Emulsification Methods, *IFMBE Proceedings*, **62**, 317-322.
- Kasyafi, A., 2016, Sintesis Tetrahidropentagamavunon-0 (THPGV-0) Dengan Variasi Jumlah Katalis Palladium/Karbon (Pd/C), *Skripsi*, Universitas Gadjah Mada, Yogyakarta.
- Khan, B.A., Akhtar, N., Rasul, A., Khan, H., Murtaza, G., Ali, A., Khan, K.A., Shafiq-uz-Zaman, Jameel, A., Waseem, K., & Mahmood, T., 2012, Human skin, aging and antioxidants, *J. Med. Plants Res.*, **6**(1), 1-6.
- Khasanah, N., 2016, Pengaruh Konsentrasi Polimer Karbopol 940 sebagai *Gelling Agent* Terhadap Sifat Fisik Emulgel *Gamma-Oryzanol*, *Skripsi*, Universitas Islam Negeri Syarif Hidayatullah, Jakarta.
- Khurana, S., Jain, N.K., & Bedi, P.M.S., 2013, Nanoemulsion Based Gel for Transdermal Delivery of Meloxicam: Physico-chemical, Mechanistic Investigation, *Life Sciences*, **92** (6-7), 383-392.
- Kim, S., Chen, J., Cheng, T., Gindulyte, A., He, J., He, S., Li, Q., Shoemaker, B.A., Thiessen, P.A., Yu, B., Zaslavsky, L., Zhang, J., & Bolton, E.E., 2019, Polysorbate 80, <https://pubchem.ncbi.nlm.nih.gov/compound/5281955>, 14 Mei 2019.
- Kim, S.W., Garcia, C.V., Lee, B.N., Kwon, H.J., & Kim, J.T., 2017, Development of Tumeric Extract Nanoemulsions and Their Incorporation into Canned Ham, *Korean J Food Sci Anim Resour.*, **37** (6), 889-897.
- Komaiko, J.S., & McClements D.J., 2016, Formation of Food-Grade Nanoemulsions Using Low-Energy Preparation *Methods*: A Review of Available Methods, *CRFSFS*, **15** (2), 331-352.
- Krisdayani, C. N., 2017, Optimasi Formula Emulsi dengan Tween 80 dan Span 80 untuk Sediaan Emulgel Tetrahidropentagamavunon-0 (THPGV-0), *Skripsi*, Universitas Gadjah Mada, Yogyakarta.
- Kumar, D., Singh, J., Antil, M., & Kumar, V., 2016, Emulgel-Novel Topical Drug Delivery System- A Comprehensive Review, *IJPSR*, **7** (12), 4733-4742.
- Kuncari, E.S., Iskandarsyah, Praptiwi, 2014, Evaluasi, Uji Stabilitas Fisik dan Sinerisis Sediaan Gel yang Mengandung Minoksidil, Apigenin dan Perasan Herba Seledri (*Apium graveolans L.*), *Bul. Penelit. Kesehat*, **42** (4), 213-222.

- Mahtab, A., Anwar, M., Mallick, N., Naz, Z., Jain, G.K., Ahmad, F.J., 2016. Transungual delivery of ketoconazole nanoemulgel for the effective management of onychomycosis, *AAPS PharmSciTech*, **17** (6), 1477–1490.
- Majeed, M., Badmaev, V., Shivakumar, U., & Rajendran, R., 1995, *Curcuminoids antioxidant phytonutrients*, 1-75, Nutriscience Publisher, Piscataway.
- Marchaban, Fudholi, A., Saifullah, T.N.S., Martien, R., Kuswahyuning, R., Bestari, A.N., Indrayan, B., 2017, *Teknologi Formulasi Sediaan Cair Semi Padat*, 88-91, Fakultas Farmasi Universitas Gadjah Mada, Yogyakarta.
- McClements, D.J., & Rao, J., 2011, Food-grade Nanoemulsions: Formulation, Fabrication, Properties, Performance, Biological Fate and Potential Toxicity, *Crit Rev Food Sci Nutr.*, **51** (4), 285-330.
- McClements, D.J., 2016, *Food Emulsions Principles, Practices, and Techniques*, Edisi 3, 125, CRC Press, Boca Raton.
- Mollet, H., & Grubenmann, A., 2001, *Formulation Technology: Emulsions, Suspensions, Solid Form*, 261-262, Wiley-Vch, Toronto.
- More, A., & Ambekar, A.W., 2016, Development and Characterization of Nanoemulsion Gel for Topical Drug Delivery of Nabumetone, *IJPPR.Human*, **7** (3), 126-157.
- Muchtadi, D., 2013, *Antioksidan dan Kiat Sehat di Usia Produktif*, 3, 29, Alfabeta, Bandung.
- Naz, Z., & Ahmad, F.J., 2015, Curcumin-loaded Colloidal Carrier System: Formulation Optimization, Mechanistic Insight, Ex Vivo and In Vivo Evaluation, *Int J Nanomedicine*, **10** (1), 4293-4307.
- Pavithra, K., & Vadivukkarasi, S., 2015, Evaluation of free radical scavenging activity of various extract of leaves from *Kedrostis foetidissima* (Jacq.) Cogn., *FSHW*, **4** (1), 42-46.
- Pawar, K.R., & Babu, R.J., 2014, Lipid Materials for Topical and Transdermal Delivery of Nanoemulsions, *Crit Rev Ther Drug.*, **31** (5), 429-458.
- Phad, A.R., Dilip, N.T., & Ganapathy, R.S., 2018, Emulgel: A Comprehensive Review for Topical Delivery of Hydrophobic Drugs, *Asian J. Pharm.*, **12** (2), S382-S393.
- Prastianto, B.A., 2016, Optimasi *Gelling Agent* Carbopol 940 dan Humektan Sorbitol dalam Formulasi Sediaan Gel Ekstrak Etanol Daun Binahong (*Anredera cordifolia* (Ten.) Steenis), *Skripsi*, Universitas Sanata Dharma, Yogyakarta.
- Putri, D.O.A., 2016, Optimasi Formula Krim Senyawa Tetrahidropentagamavunon-0 Menggunakan Metode Simplex Lattice Design, *Skripsi*, Universitas Gadjah Mada, Yogyakarta.

- Rahman, A., 2018, Formulasi Sediaan Nanoemulgel Ekstrak Kayu Secang (*Caesalpinia sappan* L.) serta Uji Stabilitas Fisiknya, *Publikasi Ilmiah*, Universitas Muhammadiyah Surakarta, Surakarta.
- Rahmawati, E.D., 2017, Optimasi Konsentrasi Carbopol 940 dan Konsentrasi Asam Oleat dalam Natrium Diklofenak Basis Gel dengan Metode Desain Faktorial, *Skripsi*, Universitas Islam Negeri Maulana Malik Ibrahim, Malang.
- Rastuti, U., & Purwati, 2012, Uji Aktivitas Antioksidan Ekstrak Daun Kalba (*Albizia falcataria*) Dengan Metode DPPH (*1,1-Difenil-2-pikrilhidrazil*) dan Identifikasi Senyawa Metabolit Sekundernya, *Molekul*, **7** (1), 33-42.
- Rathi, P.B., & Deshpande, K.V., 2013, Determination and Evaluation of Solubility Parameter of Nabumetone Using Dioxane-Water System, *AJPS*, **3** (27), 30-33.
- Ren, G., Sun, Z., Wang, Z., Zheng, X., Xu, Z., & Sun, D., 2019, Nanoemulsion Formation by the Phase Inversion Temperature Method Using Polyoxypropylene Surfactants, *J. Colloid Interface Sci.*, **540**, 177-184.
- Ritmaleni & Simbara, A., 2010, Sintesis Tetrahidro Pentagamavunon-0, *Majalah Farmasi Indonesia*, **21** (2), 100-105.
- Ritmaleni, Sardjiman, Mintariyanti, B., Wulandari, E., & Purwantini, I., 2013, Antibacterial Activity of Tetrahydropentagamavunon-0 (THPGV-0) and Tetrahydropentagamavunon-1 (THPGV-1), *JNSR*, **3** (11), 12-18.
- Rose, M. R., 1991, *Evolutionary Biology of Aging*, 20, Oxford University Press, New York.
- Saberi, A.H., Fang, Y., & McClements, D.J., 2013, Fabrication of Vitamin E-enriched Nanoemulsions: Factors Affecting Particle Size Using Spontaneous Emulsification, *J. Colloid Interface Sci.*, **391** (1), 95-102.
- Sadeli, R.A., 2016, Uji Aktivitas Antioksidan dengan Metode DPPH (*1,1-diphenyl-2-picrylhydrazyl*) Ekstrak Bromelain Buah Nanas (*Ananas comosus* (L.) Merr.), *Skripsi*, Universitas Sanata Dharma, Yogyakarta.
- Savale, S.K., 2017, Design and Development of Curcumin Nanoemulsion by Applying Centre Composite Rotable Design Response Surface Model (CCRD-RSM), *AJRBPS*, **5** (3), 96-104.
- Sengputa, P., & Chatterjee, B., 2017, Potential and Future Scope of Nanoemulgel Formulation for Topical Delivery of Lipophilic Drugs, *Int J Pharm*, **526** (1-2), 353-365.
- Setya, S., Talegaonkar, S., & Razdan, B.K., 2014, Nanoemulsions: Formulation Methods and Stability Aspects, *WJPPS*, **3** (2), 2214-2228.
- Shah, P., Bhalodia, D., & Shelat, P.K., 2010, Nanoemulsion: A Pharmaceutical Review, *Sys Rev Phar*, **1** (1), 24-32.

- Shekar, T.C., & Anju, G., 2014, Antioxidant Activity by DPPH Radical Scavenging Method of *Ageratum conyzoides* Linn. Leaves, *Ajethno*, 244-249.
- Shinoda, K., & Saito, H., 1968, The Effect of Temperature on the Phase Equilibria and the Types of Dispersions of the Ternary System Composed of Water, Cyclohexane, and Nonionic Surfactant, *J. Colloid Interface Sci.*, **26** (1), 70-74.
- Siagian, A., 2002, Bahan Tambahan Makanan, Universitas Sumatera Utara, Medan.
- Simbara, A., 2009, Sintesis dan Uji Aktivitas Antioksidan Senyawa Tetrahidropentagamavunon (THPGV-0), *Tesis*, Universitas Gadjah Mada, Yogyakarta.
- Solans, C., & Sole, I.C., 2012, Nanoemulsions: Formation by Low-energy Methods, *COCIS*, **17** (5), 246-254.
- Suciati, T., Aliyandi, A., & Satrialdi, 2014, Development of Transdermal Nanoemulsion Formulation for Simultaneous Delivery of Protein Vaccine and Artin-M Adjuvant. *IJPPSs*, **6** (6), 536-546.
- Talegaonkar, S., Azeem A., Ahmad, F.J., Khar, R.K., Pathan, S.A., & Iqbal Z.I., 2018, Microemulsions: A Novel Approach to Enhanced Drug Delivery, *Recent Pat Drug Deliv Formul.*, **2** (3), 238-257.
- Wallick, D., 2009, Polyethylene Glycol, dalam Rowe, R. C., Sheskey, P. J. & Owen S.C., (Eds.), *Handbook of Pharmaceutical Excipients*, Edisi 6, 517-522, Pharmaceutical Press and American Pharmacist Association, London.
- Wastuwidya, G., 2017, Pengaruh Variasi Kadar THPGV-0 (Tetrahidropentagamavunon-0) Dalam Sediaan Krim terhadap Efek Iritasi Akut Dermal dan Nilai SPF (Sun Protecting Factor), *Skripsi*, Universitas Gadjah Mada, Yogyakarta.
- Wicaksono, D.R., 2015, Optimasi Rice Bran Oil, Tween 80-Propilen Glikol, dan Air dalam Formulasi Nanoemulsi untuk Sediaan Nanoemulgel Ketoprofen Menggunakan CMC-Na, *Skripsi*, Universitas Gadjah Mada, Yogyakarta.
- Wijayanto, B.A., Kurniawan, D.A., & Sobri Iskandar, 2013, Formulasi dan Efektivitas Gel Antiseptik Tangan Minyak Atsiri Lengkuas (*Alpinia galanga* (L.) Willd.), *JIFI*, **11** (2), 102-107 cit. Zatz, J.L., & Kushla, G.P., 1996, Gels, dalam Lieberman, H.A., Lachman, L., & Schwatz, J.B., (Eds.), *Pharmaceutical Dosage Forms: Disperse System*, Edisi 2, 413-414, Marcel Dekker Inc., New York.
- Yogesthinaga, Y.W., 2016, Optimasi Gelling Agent Carbopol dan Humektan Propilen Glikol dalam Formulasi Sediaan Gel Ekstrak Etanol Daun Binahong (*Anredera cordifolia* (Ten.) Steenis), *Skripsi*, Universitas Sanata Dharma, Yogyakarta.

- Yukuyama, M.N., Ghisleni, D.D.M., Pinto, T.J.A., & Bou-Chacra, N.A., 2016, Nanoemulsion: Process Selection and Application in Cosmetics – A Review, *Int J Cosmet Sci.*, **38** (1), 13-24.
- Zhang, D., 2009, Polyoxyethylene Sorbitan Fatty Acid Esters, dalam Rowe, R. C., Sheskey, P. J. & Owen S.C., (Eds.), *Handbook of Pharmaceutical Excipients*, Edisi 6, 549-553, Pharmaceutical Press and American Pharmacist Association, London.
- Zhang, Y., Shang, Z., Gao, C., Du, M., Xu, S., Song, H., & Liu, T., 2014, Nanoemulsion for Solubilization, Stabilization, and In Vitro Release of Pterostilbene for Oral Delivery, *AAPS PharmSciTech*, **15** (4), 1000-1008.
- Zulfa, E., Novianto, D., & Setiawan, D., 2019, Formulasi Nanoemulsi Natrium Diklofenak dengan Variasi Kombinasi Tween 80 dan Span 80: Kajian Karakteristik Fisik Sediaan, *Media Farmasi Indonesia*, **14** (1), 1471-1477.