

DAFTAR PUSTAKA

- Abdullah, M. dan Khairurrijal, K., 2009, Review: Karakterisasi Nanomaterial, *J. Nano Saintek*, 2(1), 1–9.
- Afonso, C., Hirano, R., and Gaspar, A., 2019, Biodegradable Antioxidant Chitosan Films Useful as an Anti-Aging Skin Mask, *J. Biomac.*, 132, 1262–1273.
- Agudelo, W., Montoya, Y., and Bustamante J., 2018, Using a non-Reducing Sugar in the Green Synthesis of Gold and Silver Nanoparticles by the Chemical Reduction Method, *DYNA*, 85(206), 69–78.
- Alam, A.N., Bintari, S.H., dan Mubarak, I., 2017, Penentuan Konsentrasi Minimum Ekstrak Daun Anting-Anting (*Acalypha indica* L.) sebagai Antibakteri pada *Staphylococcus aureus*, *Life Science*, 6(1), 34–39.
- Allaker, R.P. and Memarzadeh, K., 2014, Nanoparticles and the Control of Oral Infections, *Int. J. Antimicrob. Agents*, 43(2), 95–104.
- An, J., Zhang, M, Wang, S., and Tang, J., 2008, Physical, Chemical and Microbiological Changes in Stored Green Asparagus Spears as Affected by Coating of Silver Nanoparticles-PVP, *LWT Food Sci. Technol.*, 41(6), 1100–1107.
- Anigol, L.B., Charantimath, J.S., and Gurubasavaraj, P.M., 2017, Effect of Concentration and pH on the Size of Silver Nanoparticles Synthesized by Green Chemistry, *Org. and Med. Chem. Int. J.*, 3(5), 1–5.
- Ariyanta, H.A., 2014, Preparasi Nanopartikel Perak dengan Metode Reduksi dan Aplikasinya sebagai Antibakteri Penyebab Luka Infeksi, *MKMI*, 10(1), 36–42.
- Augustine, R., Kalarikkal, N., and Thomas, S., 2014, A Facile and Rapid Method for the Black Pepper Leaf Mediated Green Synthesis of Silver Nanoparticles and the Antimicrobial Study, *Appl. Nanosci.*, 4(7), 809–818.
- Averous, L., 2004, Biodegradable Multiphase Systems Based on Plasticized Starch: A Review, *J. Macromol. Sci. A*, 44(23), 231–274.
- Azeredo, H.M.C., Mattoso, L., and McHugh, T., 2011, Nanocomposites in Food Packaging – A Review, *Adv. Divers. Ind. Appl. Nanocomposites*, 57–78.
- Basu, A., Kundu, S., Sana, S., Halder, A., Abdullah, Md. F., Datta, S., and Mukherjee, A., 2017, Edible Nano-Bio-Composite Film Cargo Device for Food Packaging Applications, *Food Packag. Shelf Life*, 11, 98–105.
- Bhagyanathan, N.K. and Thoppil, J.E., 2018, Plant-Mediated Synthesis of Silver Nanoparticles by Two Species of *Cynanchum* L. (Apocynaceae): A

Comparative Approach on its Physical Characteristics, *Int. J. Nano Dimens.*, 9(2), 104–111.

Bordes, P., Pollet, E., and Averous, L., 2009, Nano-biocomposites: Biodegradable Polyester/Nanoclay Systems, *Prog. Polym. Sci.*, 34(2), 125–155.

Bourtoom T, 2008, Plasticizer Effect on the Properties of Biodegradable Blend Film from Rice Starch-Chitosan, *Songklanakarin J. Sci. Technol.*, 30, 149-165.

Cha, D. S. and Chinnan, M. S., 2004, Biopolymer-based Antimicrobial Packaging: A Review, *Crit. Rev. Food Sci. Nutr.*, 44(4), 223–237.

Chandy, T. and Sharma, C.P., 1990, Chitosan-as a Biomaterial, *Biomater. Art., Cells, Art. Org.*, 18(1), 1–24.

Chen, S., Wu, G., and Zeng, H., 2005, Preparation of High Antimicrobial Activity Thiourea Chitosan-Ag⁺ Complex, *Carbohydr. Polym.*, 60(1), 33–38.

Chibbar, R. N., Jaiswal, S., Gangola, M., and Baga, M., 2016, Carbohydrate Metabolism, *Reference Module in Food Science*, 1–13.

Chuchita, 2018, Sintesis Nanopartikel Perak Nitrat dengan Tirosin Sebagai Reduktor dan Agen Pengkaping Untuk Membentuk Nanokomposit Pada Film Poli Asam Laktat Sebagai Uji Antibakteri, *Tesis*, FMIPA Universitas Gadjah Mada, Yogyakarta.

Darroudi, M., Ahmad, M. B., Zamiri, R., Zak, A. K., Abdullah, A. H., and Ibrahim, N. A., 2011, Time-dependent Effect in Green Synthesis of Silver Nanoparticles, *Int. J. Nanomed.*, 6(1), 677–681.

Darroudi, M., Ahmad, M.B., Abdullah, A.H., Ibrahim N.A., and Shameli, K., 2010, Effect of Accelerator in Green Synthesis of Silver Nanoparticles, *Int. J. Mol. Sci.*, 11(10), 3898–3905.

Dewi, N.M., 2018, Pemanfaatan Limbah Radiografi Sebagai Sumber Ag pada Pembuatan Fotokatalis TiO₂-Ag dan Uji Aktivitasnya Untuk Penghilangan Zat Warna Batik di Bawah Sinar Visibel, *Tesis*, FMIPA Universitas Gadjah Mada, Yogyakarta.

Elumalai, E.K., Prasad, T.N.K.V., Nagajyothi, P.C., and David, E., 2011, A Bird's Eye View on Biogenic Silver Nanoparticles and Their Application, *Pelagia Res. Library*, 2(2), 88-97.

Fajaroh, F., 2018, Sintesis Nanopartikel dengan Prinsip Kimia Hijau, *Prosiding Seminar Nasional Kimia dan Pembelajarannya*, 3 November 2018, Malang.

- Faupel, F., Zaporozhchenko, V., Strunskus, T., and Elbahri, M., 2010, Metal-Polymer Nanocomposites for Functional Applications, *Adv. Eng. Mater.*, 12(12), 1177–1190.
- Feng, Q.L., Wu, J., Chen, G.Q., and Cui, F.Z., 2000, A Mechanistic Study of the Antibacterial Effect of Silver Ions on *E. coli* and *Staphylococcus aureus*, *J. Biomed. Mater. Res.*, 52(4), 662–668.
- Filippo, E., Serra, A., Buccolieri, A., and Manno, D., 2010, Green Synthesis of Silver Nanoparticles with Sucrose and Maltose: Morphological and Structural Characterization, *J. Non-Cryst. Solids*, 356(6–8), 344–350.
- Gerente, C., Lee, V.K.C., Leclaire P., and McKay, G., 2007, Application of Chitosan for the Removal of Metals from Wastewaters by adsorption: Mechanisms and Models Review, *Crit. Rev. Env. Sci. Technol.*, 37(1), 41–127.
- Gunsolus, I.L., Mousavi, M.P.S., Hussein, K., Bühlmann, P., and Haynes, C.L., 2015, Effects of Humic and Fulvic Acids on Silver Nanoparticle Stability, Dissolution, and Toxicity, *Environ. Sci. Technol.*, 49(13), 8078–8086.
- Guzman, M.G., Dille, J., and Godet, S., 2009, Synthesis of Silver Nanoparticles by Chemical Reduction Method and Their Antibacterial Activity, *Int. J. Chem. Biol. Eng.*, 2(3), 104–111.
- Hammond, J., Bhalla, N., Rafiee, S., and Estrela, P., 2014, Localized Surface Plasmon Resonance as a Biosensing Platform for Developing Countries. *Biosensors*, 4(2), 172–188.
- Haryono, A. dan Harmami, S. B., 2010, Aplikasi Nanopartikel Perak pada Serat Katun sebagai Produk Jadi Tekstil Antimikroba, *J. Kim., Indones.*, 5(1), 1–6.
- Haryono, A., Sondari, D., Harmami, S.B., dan Randy, M., 2008, Sintesis Nanopartikel Perak dan Potensi Aplikasinya, *J. Riset Industri.*, 2(3), 156–163.
- Imran, H., Revol-Junelles, A. M., Martyn, A., Tehrany, E. A., Jacquot, M., and Linder, M., 2010, Active Food Packaging Evolution: Transformation from Microto Nanotechnology, *Crit. Rev. Food Sci. Nutr.*, 50(9), 799–821.
- Irfan, M., Ahmad, T., Moniruzzaman, M., and Abdullah, B., 2017, Effect of pH on Ionic Liquid Mediated Synthesis of Gold Nanoparticle Using *Elaise guineensis* (Palm Oil) Kernel Extract, *IOP Conf. Ser. Mater. Sci. Eng.*, 204, 1–7.
- Jannoo, K., Teerapatsakul, C., Punyanut, A., and Pasanphan, W., 2015, Electron Beam Assisted Synthesis of Silver Nanoparticle in Chitosan Stabilizer:

Preparation, stability and Inhibition of Building Fungi Studies, *Radiat. Phys. Chem.*, 112, 177–188.

Kadam, D., Momin, B., Palamthodi, S., and Lele, S.S., 2019, Physicochemical and Function Properties of Chitosan-based Nano-composite Films Incorporated with Biogenic Silver Nanoparticles, *Carbohydr. Polym.*, 211, 124–132.

Kamdem, D., Shen, Z., and Nabinejad, O., 2019, Development of Biodegradable Composite Chitosan-Based Films Incorporated with Xylan and Carvacrol for Food Packaging Application, *Food Packaging and Shelf Life*, 21, 1–7.

Kiswandono, A.A., 2014, Study on the Transport of Phenol Through Crosslinked Polyeugenol Based Polymer Inclusion Membrane (Pim), *Disertasi*, Kimia FMIPA Universitas Gadjah Mada, Yogyakarta.

Korbekandi, H., and Iravani, S., 2012, *Silver Nanoparticles, The Delivery of Nanoparticles*, Editor A.A. Hasyim, InTech, Isfahan.

Krisna, A. 2011, Pengaruh Regelatinasi Dan Modifikasi Hidrotermal Terhadap Sifat Fisik Pada Pembuatan Edible Film Dari Pati Kacang Merah (*Vigna angularis sp.*), *Tesis*, Universitas Diponegoro, Semarang.

Krochta, J.M., 2002, *Protein as Raw Material for Films and Coatings: Definitions Current Status, and Opportunities*, in *Protein-Based Film and Coatings*, Ed. A Generations, CRC Press, New York.

Lembang, E. Y., Maming, dan Zakir, M., 2013, Sintesis Nanopartikel Perak dengan Metode Reduksi Menggunakan Bioreduktor Ekstrak Daun Ketapang (*Terminalia catappa*), *Repository*, Universitas Hasanuddin, Makassar.

Levy, D. E., 2005, *The Organic Chemistry of Sugars*, CRC Press, Boca Raton.

Li, Q., Mahendra, S., Lyon, D. Y., Brunet, L., Liga, M. V., Li, D., and Alvarez, P. J. J., 2008, Antimicrobial Nanomaterials for Water Disinfection and Microbial Control: Potential Applications and Implications, *Water Res.*, 42(18), 4591–4602.

Lim, L. Y. and Wan, L.S.C., 1995, Heat Treatment of Chitosan Films, *Drug Dev. Ind. Pharm.*, 21(7), 839–846.

Lou, C.W., Chen, A., Lic, T., and Lin, J.H., 2014, Antimicrobial Activity of UV-Induced Chitosan Capped Silver Nanoparticles, *Mater. Lett.*, 128, 248–252.

Ludueña, L.N., Alvarez, V.A., and Vazquez, A., 2007, Processing and Microstructure of PCL/Clay Nanocomposites, *Mater. Sci. Eng. A.*, 460–461, 121–129.

- Magudapathy, P., Gangopadhyay, P., Panigrahi, B.K., Nair, K.G.M., and Dhara, S., 2001, Electrical Transport Studies of Ag Nanoclusters Embedded in Glass Matrix, *Phys. B Condens. Matter*, 299(1–2), 142–146.
- Mahesti, N.D., 2014, Kajian Recovery Logam Perak Dari Limbah Fotografi Menggunakan Asam Organik Dari Limbah Buah Dan Sayur Sebagai Reduktor Dan Pengaruh Penambahan Gas N₂, *Tesis*, FMIPA UGM.
- Malagurski, I., Levic, S., Nesic, S., Mitric, M., Pavlovic, V., and Dijimetrvic - Brankovic, S., 2017, Mineralized Agar-based Nanocomposite Films: Potential Food Packaging Materials with Antimicrobial Properties, *Carbohydr. Polym.*, 175(1), 55–62.
- Martien, R., Adhyatmika, Irianto, I.D.K., Farida, V., dan Sari, D.P., 2012, Perkembangan Teknologi Nanopartikel sebagai Sistem Penghantaran Obat, *Maj. Farm.*, 8(1), 133–144.
- Martinez-Camacho, A.P., Cortez-Rocha, M.O., Ezquerro-Brauer, J.M., GracianoVerdugo, A.Z., Rodriguez-Felix, F., Castillo-Ortega, M.M., Yepiz-Gomez, M.S., and Plascencia-Jatomea, M., 2010, Chitosan Composite Film: Thermal, Structural, Mechanical and Antifungal Properties, *Carbohydr. Polym.*, 82(2), 305–515.
- Martínez-Castañón, G.A., Niño-Martínez, N., Martínez-Gutierrez, F., Martínez-Mendoza, J.R., and Ruiz, F., 2008, Synthesis and Antibacterial Activity of Silver Nanoparticles with Different Sizes, *J. Nanoparticle Res.*, 10(8), 1343–1348.
- McMurry, J., 2008, *Organic Chemistry*, Thomson Learning, London.
- Modrzejewska, Z., Dorabialska, M., Zarzycki, R., and Wojtasz-Pajak, A., 2009, Mechanism of Sorption of Ag⁺ Ions on Chitosan Microgranules: IR and NMR Studies, *PCACD*, XIV, 49–64.
- Morones, J.R., Elechiguerra, J.L., Camacho, A., Holt, K., Kouri, J.B., Ramirez, J.T., and Yacaman, M.J., 2005, The Bactericidal Effect of Silver Nanoparticles, *Nanotechnology*, 16(10), 2346–2353.
- Nakamura, T., Herbani, Y., Ursescu, D., Banici, R., Dabu, R.V., and Sato, S., 2013, Spectroscopic Study of Gold Nanoparticle Formation Through High Intensity Laser Irradiation of Solution, *AIP Adv.*, 3.
- Nam, K.Y., 2011, In Vitro Antimicrobial Effect of Tissue Conditioner Containing Silver Nanoparticles, *J. Adv. Proshodont*, 3(1), 20–24.
- Njagi, E.C., Huang, H., Stafford, L., Genuino, H., Galindo, H.M., Collins, J.B., Hoag, G.E., and Suib, S.T., 2011, Biosynthesis of Iron and Silver

Nanoparticle at Room Temperature Using Aqueous Sorghum Bran Extracts, *Langmuir*, 27(1), 264–271.

Norajit, K., Kim, K.M., and Ryu, G.H., (2010), Comparative Studies and Antioxidant Properties of Biodegradable Alginate Films Containing Ginseng Extract, *J. Food Eng.*, 98(3), 377–384

Pal, S., Tak, Y.K., and Song, J.M., 2007, Does the Antibacterial Activity of Silver Nanoparticles Depend On the Shape of the Nanoparticle? A Study of the Gram-negative Bacterium *E. coli*, *Appl. Environ. Microb.*, 73(6), 1712–1720.

Pavia, D.L., Lampman, G.M., and Kriz, G.S., 2001, *Introduction to Spectroscopy*, Department of Chemistry, Western Washington University, Bellingham.

Pennycook, T.J., McBride, J.R., Rosenthal, S.J., Pennycook, S.J., and Pantelides, S.T., 2012, Dynamic Fluctuations in Ultrasmall Nanocrystals Induce White Light Emission, *Nano Lett.*, 12(6), 3038–3042.

Pettegrew C., Dong, Z., Muhi, M.Z., Pease, S., Mottaleb, M.A., and Islam, M.R., 2014, Silver Nanoparticle Synthesis Using Monosaccharides and Their Growth Inhibitory Activity against Gram-Negative and Positive Bacteria, *ISRN Nanotechnology*, 1–8.

Purnavita, S., dan Utami, W.T., 2018, Pembuatan Plastik Biodegradable dari Pati Aren dengan Penambahan Aloe Vera, *J. Inovasi Teknik Kimia*, 3(2), 31–35.

Purwanti, A., 2010, Analisis Kuat Tarik dan Elongasi Plastik Kitosan Terplastisasi Sorbitol, *Jurnal Teknologi*, 3(2), 99–106.

Radji, M., 2011, *Mikrobiologi*, Buku Kedokteran EGC, Jakarta.

Rai, A., Singh, A., Ahmad, A., and Sastry, M., 2006, Role of Halide Ions and Temperature on the Morphology of Biologically Synthesized Gold Nanotriangles, *Langmuir*, 22(2), 736–741.

Rastina, Sudawanto, M., dan Wientarsih, L., 2015, Aktivitas Antibakteri Ekstrak Etanol Daun Kari (*Murraya koenigii*) terhadap *Staphylococcus aureus*, *E. coli*, dan *Pseudomonas sp.*, *Jurnal Kedokteran Hewan*, 9(2), 185–188.

Retnaningsih, A., Primadimanti, A., dan Marisa, I., 2019, Uji Daya Hambat Ekstrak Etanol Biji Pepaya terhadap Bakteri *E. coli* dan *Shigella dysenteriae* dengan Metode Difusi Sumuran, *JAF*, 4(2), 122–129.

Rhim, J. and Ng, P.K.W., 2007, Natural Biopolymer-Based Nanocomposite Films for Packaging Applications Natural Biopolymer-Based Nanocomposite Films for Packaging, *Crit. Rev. Food Sci. Nutr.*, 47(4), 411–433.

- Rhim, J.W., Hong, S.I., Park, H.M. and Ng, P.K.W., 2006, Preparation and Characterization of Chitosan-Based Nanocomposite Film with Antimicrobial Activity, *J.Agric. Food Chem.*, 54(16), 5814–5822.
- Rhim, J.W., Park, H.M., and Ha, C.S., 2013, Bio-nanocomposites for Food Packaging Applications, *Prog. Polym. Sci.*, 38(10–11), 1629–1652.
- Safitri, I., Riza, M., dan Syaubari, 2016, Uji Mekanik Plastik Biodegradable dari Pati Sagu dan Grafting Poly(Nipam)-Kitosan dengan Penambahan Minyak Kayu Manis (*Cinnamomum burmannii*) Sebagai Antioksidan, *J. Litbang Ind.*, 6(2), 107–116.
- Saifuddin, N., Wong C.W., and Yasimura, A.N., 2009, Rapid Biosynthesis of Silver Nanoparticles Using Culture Supernatant of Bacteria with Microwave Irradiation, *E. J. Chem.*, 6(1), 61–70.
- Salesman, F., dan Farida, U., 2018, Penilaian Bahan Berbahaya Beracun Pada Laboratorium Radiologi RSUD Bangil Kabupaten Pasuruan,, *IJOSH*, 7(1), 122–129.
- Samberg, M.E., Oldenburg, S.J., and Monteiro-Riviere, N.A., 2010, Evolution of Silver Nanoparticle Toxicity in Vivo Skin and Invitro Keratinocytes, Environmental Health Perspectives, *Environ. Health. Perspect.*, 118(3), 407–413.
- Sanda, M.F., 2012, *Base Theory for UV-VIS Spectrophotometric Measurements*, University of Oradea, Romania.
- Sedaghat, S., Arshadi, E., and Moradi O., 2018, Green Synthesis and Characterization of Silver Nanoparticles Using Fructose, *Asian J. Green Chem.*, 3, 41–50.
- Selvakannan, P.R., Swami, A., Srisathiyanarayanan, D., Shirude, P.S., Pasricha, R., Mandale, A.B., and Sastry, M., 2004, Synthesis of Aqueous Au Core-Ag Shell Nanoparticles Using Tyrosine as a pH-Dependent Reducing Agent and Assembling Phase-Transferred Silver Nanoparticles at the Air-Water Interface, *Langmuir*, 20(18), 7825–7836.
- Shameli, K., Ahmad, M. Bin, Jazayeri, S.D., Sedaghat, S., Shabanzadeh, P., and Jahangirian, H., 2012, Synthesis and Characterization of Polyethylene Glycol Mediated Silver Nanoparticles by The Green Method, *Int. J. Mol. Sci.*, 13(6), 6639–6650.
- Shameli, K., Ahmad, M.B., Zargar, M., Yunus, W.M.Z.W., Ibrahim, N.A., Shabanzadeh, P., Ghaffari, M., Moghaddam, 2011, Synthesis and Characterization of Silver/Montmorillonite/Chitosan Bionanocomposites

by Chemical Reduction Method and Their Antibacterial Activity, *Int. J. Nanomed.*, 6, 271–284.

Shamila, S., Zafar, N., Riaz, S., Sharif, R., Nazir, J., and Naseem, S., 2016, Gold Nanoparticles: An Efficient Antimicrobial Agent Against Enteric Bacterial Human Pathogen, *Nanomaterials*, 6(4), 1–10.

Shankar, S., Teng, X., and Rhim, J.W., 2014, Properties and Characterization of Agar/CuNP Bionanocomposite Films Prepared with Different Copper Salts and Reducing Agents, *Carbohydr. Polym.*, 114, 484–492.

Sharma, V.K., Yngard, R.A., and Lin, Y., 2009, Silver Nanoparticles: Green Synthesis and Their Antimicrobial Activities, *Adv. Colloid Interface Sci.*, 145(1–2), 83–96.

Šileikaite, A., Prosyčevs, I., Puišo, J., Juraitis, A., and Guobienė, A., 2006, Analysis of Silver Nanoparticles Produced by Chemical Reduction of Silver Salt Solution, *Mater. Sci., (Medžiagotyra)*, 12(4), 287–291.

Singh, C., Sharma, V., Naik, P.K., Khandelwal, V., and Singh, H., 2011, A Green Biogenic Approach for Synthesis of Gold and Silver Nanoparticles Using Zingiber Officinale, *Dig. J. Nanomater. Biostructures*, 6(2), 535–542.

Siracusa, V., Rocculi, P., Romani, S., and Rossa, M. D., 2008, Biodegradable Polymers for Food Packaging: A Review, *Trends Food Sci. Technol.*, 19(12), 634–643.

Sirajudin, A. dan Rahmanisa, S., 2016, Nanopartikel Perak Sebagai Penatalaksanaan Penyakit Infeksi Saluran Kemih, *Jurnal Penelitian: Majority*, 5(4), 1–5.

Sisnayati, Hatina, S., dan Rahmi, A., 2019, Pengaruh Aditif Bawang Putih Terhadap Karakteristik dan Biodegradasi Bioplastik dari Biji Durian, *TEKNIKA*, 6(1), 58–67.

Smitha, S.L., Nissamudeen, K.M., Philip, D., and Gopchandran K.G., 2008, Studies on Surface Plasmon Resonance and Photoluminescence of Silver Nanoparticles, *Spectrochim. Acta, Part A*, 71(1), 186–190.

Solomon, S.D., Bahadory, M., Jeyarajasingam, A.V., Rutkowsky, S.A., Boritz, C., and Mulfinger, L., 2007, Synthesis and Study of Silver Nanoparticles, *J. Chem. Educ.*, 84(2), 322–325.

Solomons, T.W.G. and Fryhle, C.B., 2011, *Organic Chemistry*, John Wiley and Sons Inc., New York.

- Sondi and Salopek-Sondi, B., 2004, Silver Nanoparticles as Antimicrobial Agent: a Case Study on *E.coli* as a Model for Gram-Negative Bacteria, *J. Colloid Interface Sci.*, 275(1), 177–82.
- Song, J.Y., Jang, H.K., and Kim, B.S., 2009, Biological Synthesis of Gold Nanoparticles Using *Magnolia kobus* and *Diospyros kaki* Leaf Extracts, *Process Biochem.*, 44(1), 1133–1138.
- Sorrentino, A., Gorrasi, G., and Vittoria, V., 2007, Potential Perspectives of Bio-Nanocomposites for Food Packaging Applications, *Trends Food Sci Technol.*, 18(2), 84–95.
- Srikar, S.K., Giri, D.D., Pal, D.B., Mishra, P.K., and Upadhyay, S.N., 2016, Green Synthesis of Silver Nanoparticles: A Review, *Green Sustainable Chem.*, 6(1), 34–56.
- Stephen, A.M., 1995, *Food Polysaccharides and Their Application*, University of Cape Town, Marcel Dekker, Inc., Rondebosch.
- Surjowardojo, P., Susilorini, T.E., dan Sirait, G.R.B., 2015, Daya Hambat Dekok Kulit Apel Manalagi (*Malus sylvestris* Mill.) Terhadap Pertumbuhan *Staphylococcus aureus* dan *Pseudomonas sp* Penyebab Mastitis Pada Sapi Perah, *J. Ternak Tropika*, 16(2), 40–48.
- Suryaningrum, D.T.H., Basmal J., dan Nurochmawati, 2005, Studi Pembuatan Edible Film dari Karaginan, *J. Penelitian Perikanan Indonesia*, 11(4), 1–13.
- Susanti, Jasruddin, dan Subaer, 2015, Sintesis Komposit Bioplastik Berbahan Dasar Tepung Tapioka dengan Penguat Serat Bambu, *JSPF*, 11(2), 179–184.
- Susilowati, E., 2016, Pembuatan Film Antibakteri Nanokomposit Perak-Kitosan dengan Reduktor Glukosa dan Akselerator Natrium Hidroksida, *Disertasi*, Departemen Kimia, Fakultas MIPA, Universitas Gadjah Mada, Yogyakarta.
- Tejamaya, M., Römer, I., Merrifield, R.C., and Lead, J.R., 2012, Stability of Citrate, PVP, and PEG Coated Silver Nanoparticles in Ecotoxicology Media, *Environ. Sci. Technol.*, 46(13), 7011–7017.
- Thakur, R., Pristijon, P., Golding, J.B., Stathopoulos, C. E., Scarlett, C. J., Bowyer, M., Singh, S. P., and Vuong, Q. N., 2017, Amylose-Lipid Complex as a Measure of Variations in Physical, Mechanical and Barrier Attributes of Rice Starch- γ -Carrageenan Biodegradable Edible Film, *Food Packag. Shelf Life*, 14(B), 108–115.
- Tharanathan, R. N., 2003, Biodegradable Films and Composite Coatings; Past, Present and Future, *Trends Food Sci. Technol.*, 14(3), 71–78.

- Thilagam, M., Tamilselvi, A., Chandrasekeran, B., and Rose, C., 2013, Phytosynthesis of Silver Nanoparticles Using Medicinal and Dye Yielding Plant of *Bixa Orellana* L. Leaf Extract, *JPSI*, 2(4), 9–13.
- Tiwari, A.D., Mishra, A., Mishra, S., Kuvarega, A.T., and Mamba, B.B., 2013, Stabilisation of Silver and Copper Nanoparticles in a Chemically Modified Chitosan Matrix, *Carbohyd. Polym.*, 92(2), 1402–1407
- Tripathi, T., Mehrotra, G.K., and Dutta, P.K., 2011, Chitosan-Silver Oxide Nanocomposite Film: Preparation and Antimicrobial Activity, *Bull. Mater. Sci.*, 34(1), 29–35.
- Vimala, K., Mohan, Y.M., Varaprasad, K., Redd, N.N., Ravindra, S., Naidu, N.S., and Raju, K.M., 2011, Fabrication of Curcumin Encapsulated Chitosan-PVA Silver Nanocomposite Films for Improved Antimicrobial Activity, *J. Biomater. Nanobiotechnol.*, 2(1), 55–64.
- Vlack, L.H.V., 2004, *Elemen-Elemen Ilmu dan Rekayasa Material* Edisi ke 6, Erlangga, Jakarta.
- Wahyudi, T. dan Rismayani, S., 2008, Aplikasi Nanoteknologi Pada Bidang Tekstil, *Arena Tekstil*, 23(2), 52-109.
- Wahyudi, T., Sugiyana, dan Helmy., 2011, Sintesis Nanopartikel Perak dan Uji Aktivitasnya terhadap Bakteri *E.coli* dan *S.Aureus*, *Arena Tekstil*, 26(1), 1–6.
- Wang, H., Qiao, X., Chen, J., and Ding, S., 2005, Preparation of Silver Nanoparticles by Chemical Reduction Method, *Colloids Surf. A Physicochem Eng. Asp.*, 256(2–3), 111–115
- Yang, K.H., Liu, Y.C., Yu, C.C., and Chen, B.C., 2011, Fabrication of Chitosan/Silver Nanocomposites Based on Electrochemical Methods for Removing Formaldehyde in Air, *Mater. Chem. Phys.*, 126(3), 993–997.
- Yang, L. and Paulson, A.T., 2000, Effects of Lipids on Mechanical and Moisture Barrier Properties of Edible Gellan Film, *Food Res. Int.*, 33(7), 571–578.
- Yoksan, R. and Chirachanchai, S., 2010, Silver Nanoparticle-loaded Chitosan-Starch Based Films: Fabrication and Evaluation of Tensile, Barrier and Antimicrobial Properties, *Mater. Sci. Eng. C*, 30(6), 891–897.
- Youssef, A.M., Abdel-aziz, M.S., and El-sayed, S.M., 2014, Chitosan Nanocomposite Films Based on Ag-NP and Au-NP Biosynthesis by *B. subtilis* as Packaging Materials, *Int. J. Biol. Macromol.*, 69, 185–191.
- Zare, Y. and Shabani, I., 2016, Polymer/Metal Nanocomposites for Biomedical Applications, *Mater. Sci. Eng. C.*, 60, 195–203.

- Zhang, X., Xiao, G., Wang, Y., Zhao, Y., Su, H., and Tan, T., 2017, Preparation of Chitosan-TiO₂ Composite Film with Efficient Antimicrobial Activities Under Visible Light for Food Packaging Applications, *Carbohydr. Polym.*, 169, 101–107.
- Zhong, Q.P. and Xia, W.S., 2008, Physicochemical Properties of Edible and Preservative Films from Chitosan/Cassava Starch/Gelatin Blend Plasticized with Glycerol, *Food Technol. Biotechnol.*, 46(3), 262–269.