

DAFTAR PUSTAKA

- Abdullah, M., dan Khairurrijal, 2009, Review: Karakterisasi Nanomaterial, *J. Nanosains dan Nanoteknologi*, 2(1), 4-5.
- Aguilar-Mendez, M.A., Martin-Martinez, E.S., Ortega-Arroyo, L., Cobian-Portillo, G., and Sanchez-Espindola, E., 2011, Synthesis and Characterization of Silver Nanoparticles: Effect on Phytopathogen *Colletotrichum gloesporioides*, *J. Nanopart. Res.*, 13, 25252-2532.
- 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.
- Alqadi, M.K., Noqtah, O.A., Alzoubi, F.Y., Alzouby, J., and Aljarrah, K., 2014, pH Effect on The Aggregation of Silver Nanoparticles Synthesized by Chemical Reduction, *Mater. Sci.*, 9, 133-139.
- Al-Thabaiti, S.A., Al-Nowaiser, F.M., Obaid, A.Y., Al-Youbi, A.O., and Khan, Z., 2008, Formation and Characterization of Surfactant Stabilized Silver Nanoparticles: A Kinetic Study, *Colloid Surf. B: Biointerfaces*, 67, 230– 237.
- Anandalakshmi, K., Venugobal, J., and Ramasamy, V., 2016, Characterization of Silver Nanoparticles by Green Synthesis Method Using *Pedalium Murex* Leaf Extract and Their Antibacterial Activity, *Applied Nanoscience*, 6(3), 399–408.
- Aripin, S., Saing, B., dan Kustiyah, E., 2017, Studi Pembuatan Bahan Alternatif Plastik Biodegradable dari Pati Ubi Jalar dengan Plasticizer Gliserol dengan Metode Melt Intercalation, *Jurnal Teknik Mesin*, 6, 79-84.
- Ariyanta, H.A., 2014, Silver Nanoparticles Preparation by Reduction Method and Its Application as Antibacterial for Cause of Wound Infection, *J. MKMI*, 1, 36-42.
- Aryanto, A.Y., 2002, Pemanfaatan Kitosan Dari Limbah Kulit Udang (Crustacea) Sebagai Bahan Untuk Pembuatan Membran, *Skripsi*, IPB, Bogor.
- 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 Antimicrobial Study, *Appl. Nanosci.*, 4, 809-818.
- Averous, L., 2004, Biodegradable Multiphase Systems Based on Plasticized Starch: A Review, *J. Macromol. Sci. A*, 12, 123-130.
- Begin, A., and Marie, R.V.C., 1999, Antimicrobial Films Produced From Chitosan, *Int. J. Biol. Macromol.*, 26, 63-67.
- 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.

- Cho, K.H., Park, J.E., Osaka, T., and Park, S.G., 2005, The Study of Antimicrobial Activity and Preservatives Effect of Nanosilver Ingredient, *Electrochim. Acta*, 51(5), 956-960.
- Chou, K.S., and Lu, Y.C., 2008, High-Concentration Nanoscale Silver Colloidal Solution and Preparing Process Thereof, *Patent Application Publication*, US/0064767 A1.
- Chowdhury, I.P., Ghosh, S., Roy, M., and Naskar, M.K., 2015, Green Synthesis of Water-Dispersible Silver Nanoparticles at Room Temperature Using Green *Carambola* (Star fruit) Extract, *J. Sl-Gel. Sci. Technol.*, 73, 199-207.
- Chuchita, 2018, Sintesis Nanopartikel Perak Nitrat dengan Tirosin Sebagai Reduktor dan Agen Pengkaping Untuk Membentuk Nanokomposit Film AgNPs-Poli Asam Laktat Sebagai Antibakteri, *Tesis*, FMIPA UGM, Yogyakarta.
- Dong, X., Gu, H., Kang, J., Yuan, X., and Wu, J., 2010, Comparative study of surface-enhanced Raman scattering activities of three kinds of silver colloids when adding anions as aggregating agents, *Colloids Surf. A: Physicochem. Eng. Aspects*, 368, 142-147.
- Duncan, G.A., and Michael, A.B., 2015, Computational Design of Nanoparticle Drug Delivery System for Selective Targeting, Royal Society of Chemistry, *Nanoscale*, 37, 1-18.
- Dwidjoseputro, 1978, *Dasar-Dasar Mikrobiologi*, Djambatan, Jakarta..
- 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.
- Feng, Q.L., Wu, J., Chen, G.Q., Cui, F.Z., Kim, T.N., and Kim, J.O., 2000, Mechanistic Study of The Antibacterial Effect of Silver Ions On Escherichia coli and Staphylococcus aureus, *J. Biomed Mater Res.*, 52(4), 662-668.
- Fransisca, D., Zulferiyenni, dan Susilowati, 2013, Pengaruh Konsentrasi Tapioka Terhadap Sifat Fisik Biodegradable Film dari Bahan Komposit Selulosa Nanas, *Jurnal Teknologi dan Hasil Pertanian*, 18(2), 195-205.
- 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.
- Habbalalu, D., Lalley, J., Nadagouda, M.N., and Varma, R.S., 2013, Surface Enhanced Raman Scattering (SERS) Studies of Gold and Silver Nanoparticles Prepared Using Plant Extracts, Enzymes, Bacteria, Biodegradable Polymer, and Microwaves, *ACS Sustain. Chem. Eng.*, 1, 703-712.
- Haryono, A., Sondari, D., Harmami, S.B., dan Randy, M., 2008, Sintesis Nanopartikel Perak dan Potensi Aplikasinya, *J. Riset Industri.*, 2(3), 156-163.

- Hasanah, A.N., 2013, Sintesis Perak Nanopartikel (*Ag-NP*) Menggunakan Ekstrak Daun Sirih Hijau (*Piper betle L.*) Serta Uji Aktivitasnya Terhadap Bakteri *E. coli* dan *S. aureus*, *Skripsi*, FMIPA UGM, Yogyakarta.
- Hasri, 2010, Prospek Kitosan dan Kitosan Termodifikasi Sebagai Biopolimer Alami yang Menjanjikan, *Jurnal Chemica*, 11 (2), 1-10.
- He, Q., Ao, Q., Gong, Y., and Zhang, X., 2011, Preparation of Chitosan Film Using Different Neutralizing Solutions to Improve Endothelial Cell Compatibility, *J. Mater. Sci. - Mater. Med.*, 22(1), 2791-2802.
- Hoven, V.P., Tangpasuthadol, V., Angkitpaiboon, Y., Vallapa, N., and Kiatkamjornwong, S., 2007, Surface-charged Chitosan: Preparation and Protein Adsorption, *Carbohydr. Polym.*, 68(1), 44-53.
- Hubler A.W., and Onyeama, O., 2010, Digital Quantum Batteries: Energy and Information Storage in Nanovacuum Tube Arrays, *Complexity*, 11(1), 48-55.
- Jawetz, E., Melnick, J. L., dan Adelberg, E.A., 2007, *Mikrobiologi Kedokteran*, Edisi 23, Kedokteran ECG, Jakarta.
- Kammona, O., and Costas, K., 2012, Recent Advances in Nanocarrier-based Mucosal Delivery of Biomolecules, *J. Controlled Release*, 161, 781-794.
- Kamsiati E., Herawati, H., dan Purwani, E.Y., J. 2017, Potensi Pengembangan Plastik Biodegradable Berbasis Pati Sagu dan Ubikayu di Indonesia, *J. Litbang Pert.*, 36(2), 67-76.
- Kasmiyatun M. dan Jos B., 2008, Ekstraksi asam sitrat dan asam oksalat: pengaruh trioctylamine sebagai *extracting power* dalam berbagai solven campuran terhadap koefisien distribusi, *Reaktor*, 12(2), 107-116.
- Kinzel, B., 1992, Protein-rich Edible Coatings for Foods, *Agric. Res.*, 40, 20-21.
- Knorr, D., 1982. Functional Properties Of Chitin And Chitosan, *J. Food Sci.*, 8, 593.
- 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.
- Li, Z., Li W., Shen J., Liu W., 2010, Development of the Measurement and Analysis System of Nanoparticle Size Distribution, *J. Adv. Mater. Res.*, 121, 168-171.
- Linder, M.C., 1992, *Biokimia Nutrisi dan Metabolisme dengan Pemakaian Secara Kimia*, UI Press, Jakarta.
- Loupatty, V.D., 2014, Nori Nutrient Analysis from Seaweed of *Porphyra marcosii* in Maluku Ocean, *Eksakta*, 11(2), 34-48.

- Lusiana, R.A., Siswanta, D., and Mudasir, Preparation of Citric Acid Crosslinked Chitosan/Poli (Vinyl Alcohol) Blend Membranes for Creatinine Transport, *Indones. J. Chem.*, 16(2), 144-150.
- Mahendra, R., Yadav, A., and Gade, A., 2009, Nanoparticles as a New Generation of Antimicrobials, *Biotechnol. Adv.*, 27, 76-83.
- 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.
- Mailu, S.N., Tesfaye T.W., Peter M.N., Fanelwa R.N., Abd A.B., Priscilla G.B., and Emmanuel I.I., 2010, Determination of Anthracene on Ag-Au Alloy Nanoparticles/Overoxidized-Polypyrrole Composite Modified Glassy Carbon Electrodes, *Sensors*, 10, 9449- 9465.
- Mishra, A., Tripathy, S.K., and Yun S.I., 2011, Biosynthesis of Gold and Silver Nanoparticles from *Candida Guilliermondii* and Their Antimicrobial Effect Against Pathogenic bacteria, *J. Nanosci Nanotechnol*, 11(1), 243-248.
- Montazer, M., Hajimirzababa, H., Rahimi M.K., and Alibakhshi, S., 2012, Durable Antibacterial Nylon Carpet Using Colloidal Nano Silver, *Fibres Text East Eur.*, 20(4), 96-101.
- Muzzarelli, R.A.A., 1985, *Chitin in The Polysaccharides 3*, Academic Press Inc., Orlando.
- Nadarajah, K., 2005, Development and Characterization of Antimicrobial Edible Films From Crawfish Chitosan, *Dissertation*, Department of Food Science, University of Paradeniya, Malaysia.
- Nataraj, D., Sakkara, S., Meghwal, M., and Reddy, N., 2018, Crosslinked Chitosan Films With Controllable Properties for Commercial Applications. *Int. J. Biol. Macromol.*, 120, 1256-1264.
- Padaki, M., Isloor, A.M., Fernandes, J., and Prabhu, K.N., 2011, New Polypropylene Supported Chitosan NF-membrane for Desalination Application, *Desalination*, 280(1), 419-423.
- Park, J.Y., Patel, D., Choi, E.S., Baek, M.J., Kim, T.J., and Lee, G.H., 2010, Salt effects on the physical properties of magnetite nanoparticles synthesized at different NaCl concentrations, *Colloids Surf. A: Physicochem. Eng. Aspects*, 367, 41-46.
- Park, P.J., Je, J.Y., and Kim, S.W., 2004, Free Radical Scavenging Activities of Different Deacetylated Chitosans Using ESR Spectrometer, *Carbohydr Polym.*, 55, 17-22.
- Pasaribu, F., Ervina, I., and Suryanto, D., 2018, The Effectiveness Antimicrobial Activity Test of Citrus Peel Extract on Some Periodontal Pathogenic Bacteria (In vitro), *IJADS*, 4(3), 146-150.
- Pathak, P., and Nagarsenker, M., 2009, Formulation and evaluation of lidocaine

- lipid nanosystems for dermal delivery, *AAPS Pharm Sci Tech*, 10(3), 985–992.
- Pavia, D.L., Lampman, G.M., and Kriz, G.S., 2001, *Introduction to Spectroscopy*. Departement of Chemistry, Western Washington University, Bellingham.
- Pinto, R.J.B., Fernandes, S.C.M., Freire, C.S.R., Sadocco, P., Causio, J., Neto, C.P., and Trindade, T., 2012, Antibacterial Activity of Optically Transparent Nanocomposite Films Based on Chitosan or Its Derivatives and Silver Nanoparticles, *Carbohydr. Res.*, 348,77–83.
- Prasad, S.B., 2013, Current Understanding of Synthesis and Pharmacological Aspects of Silver Nanoparticles, *Ame. J. of Phy. and Clin. The.*, 1(7), 536-547
- Prashanth, K.V.H and Taranathan R.N. 2007. Chitin/Chitosan: Modification and Their Unlimited Application Potential an Overview. *Trends Food Sci. Tech.*, 18, 117-131.
- Purnamasari, M.D., 2015, Sintesis Antibakteri Nanopartikel Perak Menggunakan Bioreduktor Ekstrak Daun Sirih (*Piper Betle Linn*) dengan Irradiasi Microwave, *Skripsi*, FMIPA UNNES, Semarang.
- Purnavita, S., dan Utami, W.T., 2018, Pembuatan Plastik Biodegradable dari Pati Aren dengan Penambahan Aloe Vera, *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.
- Rahayu, M., Pramonowibowo, dan Yulianto, T., 2014, Profil Asam Amino yang Terdistribusi ke Dalam Kolom Air Laut Pada Ikan Kembung (*Rastrelliger kanagurta*) Sebagai Umpan (Skala Laboratorium), *J. FRUMT*, 3(3), 238-247.
- Rajakumar, G., and Rahuman, A.A., 2011, Larvicidal Activity of Synthesized Silver Nanoparticles Using *Eclipta prostrata* Leafextract Against Filariasis and Malaria Vectors, *Acta Trop.*, 118, 196-203.
- 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, 5814- 5822.
- Roy, M., Mukherjee, P., Mandal, B.P., Sharma, R.K., Tyagi, A.K., and Kale, S.P., 2012, Biomimetic Synthesis of Nanocrystalline Silver Sol Using Cysteine: Stability and Antibacterial Activities, *RSC Adv.*, 2, 6496-6503.
- Ruparelia, J. P., Chatterjee, A. K., Duttagupta, S. P. and Mukherji, S., 2008, Strain Specificity in Antimicrobial Activity of Silver and Copper Nanoparticles, *Acta Biomater.*, 4, 707-716.
- 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, *Jurnal Litbang Industri*, 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, *Journal of Chemistry*, 6(1), 61-70.
- Saion, E., Gharibshahi, E., and Naghavi, K., 2013, Size-Controlled and Optical Properties of Monodispersed Silver Nanoparticles Synthesized by the Radiolytic Reduction Method, *Int J Mol Sci.*, 14(4), 7880–7896.
- Salesman, F., dan Farida, U., 2018, Penilaian Bahan Berbahaya Beracun Pada Laboratorium Radiologi RSUD Bangil Kabupaten Pasuruan, *IJOSH*, 7(1), 122-129.
- Salni, H.M., dan Ratna, W.M., 2011, Isolasi Senyawa Antibakteri Dari Daun Jengkol (*Pithecolobium lobatum* Benth) dan Penentuan Nilai KHM-nya, *Jurnal Penelitian Sains.*, 14(1), 38-41.
- Selvakannan, P.R., Swami, A., Srisathiyarayanan, 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, 7825-7836.
- Shameli, K., Ahmad, M.B., Zargar, M., Yunus, W.M.Z.W., Ibrahim, N.A., Shabanzadeh, P., Ghaffari, M., and Moghaddam, 2011, Synthesis and Characterization of Silver/Montmorillonite/Chitosan Bionanocomposites by Chemical Reduction Method and Their Antibacterial Activity, *Int. J. Nanomed.*, 271-284.
- Shankar, S., and Rhim, J.W., 2015, Amino Acid Mediated Synthesis of Silver Nanoparticles and Preparation of Antimicrobial Agar/Silver Nanoparticles Composite Films, *Carbohydr. Polym.*, 130, 353-363.
- Sharma, V.K., Ria A.Y., and Yekaterina L., 2009, Silver Nanoparticles: Green Synthesis and Their Antimicrobial Activities, *J. Adv. in Coll. and Int. Sci.*, 145, 83–96.
- Shih, H., and Lin, C.C., 2012, Cross-linking and Degradation of Step-growth Hydrogels Formed by Thiol-ene Photoclick Chemistry, *Biomacromolecules*, 13(7), 2003-2012.
- Shukla, M., and Arya, S., 2018, Determination Of Chloride Ion (Cl⁻) Concentration In Ganga River Water by Mohr Method at Kanpur India, *Green Chem. and Technology*, 4(1), 6-8.
- Sileikaite, A., Igoris, P., Judita, P., Algimantas, J., and Asta, G., 2006, Analysis of Silver Nanoparticles Produced by Chemical Reduction of Silver Salt Solution, *Mater Sci.*, 12, 287-291.
- Sirajudin, A., dan Rahmanisa, S., 2016, Nanopartikel Perak Sebagai Penatalaksanaan Penyakit Infeksi Saluran Kemih, *Jurnal Penelitian: Majority*, 5(4), 1-5.

- Skoog, D.A., Holler, E.J., and Crouch, S.R., 2007, *Principles of Instrumental Analysis*, Thomson Higher Education, USA.
- 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.
- Sondi, I and Sondi, B.S., 2004, Silver Nanoparticle as Antimicrobial Agent: a case Study on *E.coli* as a Model for Gram-Negative Bacteria, *J. Colloid Interface Sci.*, 275, 177-182.
- 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, 34-56.
- Stevanonic, M., Savanonic, I., Uskokovic, V., Skapin, S.D., Bracko, I., Javanonic, U., and Uskokovic, D., 2012, A New, Simple, Green, and ne-pot Four-component Synthesis of bare and poly (α,γ , L-glutamic acid)-capped Silver nanoparticles, *Col. poly. Sci.*, 290, 221-231.
- Suryaningrum, D.T.H., Basmal J., dan Nurochmawati, 2005, Studi Pembuatan Edible Film dari Karaginan, *J. Penelitian Perikanan Indonesia*, 11(4), 1-13.
- Taylor, R.A., Todd, P.O., Yasitha, H., Fabienne, B., Gary, R., Evatt, R.H., Xuchuan, J., and Sylvain, C., 2013, Feasibility of Nanofluid-based Optical Filters, *J. Opt. Soc. Am.*, 52(7), 1413-1422.
- Tiyaboonchai, W., 2003, Chitosan Nanoparticles: A promising System For Drug Delivery, *Naresuan University Journal*. 11(3), 51-56.
- Totoki, S., Wada, Y., Moriya, N., and Shimaoka, H., 2007, DEP active grating method: a new approach for size analysis of nano-sized particles, *Shimadzu Review*, 62, 173-179.
- 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, 55-64.
- 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.
- Wei, D., Sun, W., Qian, W., Ye, Y., and Ma, X., 2009, The Synthesis of Chitosan-Based Silver Nanoparticles and Their Antibacterial Activity, *Carbohydr. Res.*, 344, 2375-2382.



- Willems, V. D., 2005, *Roadmap Report on Nanoparticle*, W&W Espana s.l., Barcelona.
- Yao K., Li J., Yao F., and Yin Y., 2011, *Chitosan-Based Hydrogels: Functions and Applications*, CRC Press, Boca Raton.
- 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 *Bacillus subtilis* as Packaging Materials, *Int. J. Biol. Macromol.*, 69, 185–191.