DAFTAR PUSTAKA

Agulló, E., Rodríguez, M. S., Ramos, V., and Albertengo, L., 2003, Present and future role of chitin and chitosan in food, *Macromol. Biosci*., 3(10), 521-530.

Alhosseini, S. N., Moztarzadeh, F., Mozafari, M., Asgari, S., Dodel, M., Samadikuchaksaraei, A., Kargozar, S., and Jalali, N., 2012, Synthesis and characterization of electrospun polyvinyl alcohol nanofibrous scaffolds modified by blending with chitosan for neural tissue engineering, *Int. J. Nanomed.*, 4(7), 25-34.

Allahverdlyev, A.M., Abamor, E.S., Bagirova, M., Rafallovich, M., 2011, Antimicrobial effects of TiO_2 and Ag_2O nanoparticles againsts drug-resistant bacteria and leishmania parasites, *Future Microbiol.*, 6(8), 1-8.

Amitava, M., Mohammed, S.I., Prathna, T.C., and Chandrasekaran, N., 2011, *Antimicrobial activity of alumium oxide nanoparticles for potential clinical applications*. Dalam Mendez-Vilas, A, *Science against microbial pathogens: communicating current research and technological advances*, volume 1, Formatex Research Center, Badajoz.

Anuar, K., Amin, M., and Panhuis, M., 2012, Reinforced materials based on chitosan, TiO_2 and Ag composites, *Polymers*, 4(1), 590-599.

Berger, J., Reist, M., Mayer, J. M., Felt, O., Peppas, N. A. and Gurny, R., 2004, Structure and Interactions in Covalently and Ionically Crosslinked Chitosan Hydrogels for Biomedical Applications, *Eur. J. Phar. Bio.*, 57(1), 19-34

Caner, C., 2005, The effect of edible eggshell coatings on egg quality and consumer perception, *J. Sci. Food Agric*., 11(85), 1894-1902.

Chen, X., 2009, Titanium dioxide nanomaterials and their energy applications, *Chin. J. Catal.*, 30(8), 839- 851.

Choi, J., Park, H., and Hoffmann, M.R., 2009, Effects of single metal-ion doping on the visible-light photo-reactivity of TiO_2, *J. Phys. Chem. C*, 114(2), 783-792.

Coma, V., 2008, *Bioactive chitosan-based substances and films*. Dalam Jayakumar, R., Prabaharan, M., *Current research and development on chitin and chitosan in biomaterials science*, volume 1, Research Signpost, Trivandrum.

Dutta, P. K., Tripathi, S., Mehrotra, G. K., and Dutta, J., (2009). Perspectives for chitosan based antimicrobial films in food applications. *Food Chem.*, 114(4), 1173-1182.

Esquivel, K., Garcia, M.G., Rodriquez, F.J., Gonzalez, M.V., Escobar-Alarcon, L., Ortiz-Frade, L.,Godinez, L.A., 2011, Titanium dioxide doped with transition metals (MxTi1-xO2,M:Ni, Co): synthesis and characterization for its potential application as photo-anode, *J. Nanopart. Res.*, 13 (8) 3313-3325.

Fakin, D., Veronovski, N., Ojstrsek, A., and Bozic, M., (2012). Synthesis of TiO_2–SiO_2 colloid and its performance in reactive dyeing of cotton fabrics. Carbohydr. Polym., 88(3), 992–1001.

Farmer, V. C., 1974, *The Infrared Spectra of Minerals*. Dalam Farmer, V. C., *Mineralogical Society Monograph 4*, The Mineralogical Society, London.

Fujishima, A., and Honda, K., 1972, Electrochemical photolysis of water at a semiconductor electrode, *Nature*, 238(5358), 37-38.

Giraldo, A. L., Penuela, G. A., Torres-Palma, R. A., Pino, N. J., Palominos, R. A., and Mansilla, H. D., 2010, Degradation of the antibiotic oxolinic acid by photocatalysis with TiO_2 in suspension, *Water Res.*, 44(18), 5158-5167.

Goeme, L. T. M., Lemus, A. M. A., Morales, A. V., Lopez, G. E., and Ocampo, C. P., 2012, Study of bacterial sensitivity to Ag-TiO_2 nanoparticles, *J. Nanomed. Nanotechnol.*, 5(3), 1-7.

Hoffmann, M. R., Martin, S. T., Choi, W., and Behremann, D. W., 1995, Environmental Application of Semiconductor Photocatalysis, *Chem. Rev*., 95, 69.

Jayakumar, R., Ramachandran, R., Divyarani, V. V., Chennazhi, K. P., Tamura, H., Nair, S. V., 2010, Fabrication of chitin–chitosan/nano TiO_2-composite scaffolds for tissue engineering applications, *Int. J. Biol. Macromol*., 2(48), 336-344.

Jiang, L., Wang, F., Han, F., Prinyawiwatkul, W., No, H. K., and Ge, B., 2013, Evaluation of diffusion and dilution methods to determine the antimicrobial activity of water-soluble chitosan derivatives. *J. Appl. Microciol*, 114(4), 956-963.

Jiao, H., Yao, J., Yang, Y., Chen, X., Lin, W., and Li, Y., 2009, Chitosan/polyglycolicacid nerve grafts for axon regeneration from prolonged axotomized neurons tochronically denervated segments, *Biomater.*, 30(28), 5004-5018.

Kadam, D. M., Thunga, M., Wang, S., Kessler, M. R., Grewell, D., Lamsal, B., and Yu, C., 2013, Preparation and characterization of whey protein isolate films reinforced with porous silica coated titania nanoparticles, *J. Food Eng.*, 117(1), 133–140.

Krstić, J., Spasojević, J., Radosavljević, A., Šiljegovć, M., and Kačarević-Popović, Z., 2014, Optical and structural properties of radiolytically *in situ* synthesized silver nanoparticles stabilized by chitosan/poly(vinyl alcohol) blends, *Radiat. Phys. Chem*., (96), 158-166.

Kurniawati, R., 2005, Ag-Al_2O_3-Montmorilonit sebagai Bahan Antibakteri Salmonella typhimurium, *Skripsi*, Departemen Kimia, Fakultas Matematika and Ilmu Pengetahuan Alam, Universitas Gadjah Mada, Yogyakarta.

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,* 18(42), 4591-4602.

Li, X., Li, Y., and Ye Z., 2011, Preparation of macroporous bead adsorbents based onpoly(vinyl alcohol)/chitosan and their adsorption properties for heavy metalsfrom aqueous solution, *Chem. Eng. J*, 8(178), 60–68.

Lian, Z., Zhang, Y., and Zhao, Y., 2015, Nano-TiO_2 particles and high hydrostatic pressure treatment for improving functionality of polyvinyl alcohol and chitosan composite films and nano-TiO_2 migration from film matrix in food simulants, *Innov. Food Sci. Emerg. Technol.*, doi:10.1016/j.ifset.2015.10.008.

Lin, B., Luo, Y., Teng, Z., Zhang, B., Zhou, B., Wang, Q., 2015, Development of silver/titanium dioxide/chitosan adipate nanocomposite as an antibacterial coating for fruit storage, *Food Sci. Technol.*, 2(63), 1206-1213.

Lopez-carballo, G., Higueras, L., Gavara, R., and Hernandez-munoz, P., 2013, Silver ions release from antibacterial chitosan films containing in situ generated silver nanoparticles, *J. Agr. Food Chem.*, 61, 260-267.

Macwan, D. P., Dave, P. N., Chaturvedi, S., 2011, A review on nano-TiO_2 sol–gel type syntheses and its applications. *J. Mater. Sci.*, 46(11), 3669-3686.

Matsumura, S., Tomizawa, N., Toki, A., Nishikawa, K., and Toshima, K., 1999, Novelpoly(vinyl alcohol)-degrading enzyme and the degradation mechanism, *Macromolecules*, 32(23), 7753-7761.

Matsunaga,T., Tomoda, R., Nakajima, T., and Wake, H., 1985, Photochemical sterilization of microbial cells by semiconductor powders, *FEMS Microbiol. Lett.*, 41(29), 211-214.

McCullagh, C., Robertson, J. M. C., Bahnemann, D. W., and Robertson, P. K. J., 2007, The application of TiO_2 photocatalysis for disinfection of water contaminated with pathogenic micro-organisms, *Res. Chem. Intermed.*, 3(33), 359-375.

Mei, L., Lu, Z., Zhang, W., Wu, Z., Zhang, X., Wang, Y., Luo, Y., and Li, C., Jia, Y., 2013, Bioconjugated nanoparticles for attachment and penetration into pathogenic bacteria, *Biomater.*, 34(38), 10328-10337.

Nie, X., Zhuo, S., Maeng, G., Sohlberg, K., 2009, Doping of TiO_2 polymorphs for altered optical and photocatalytic properties, *Int. J. Photoenergy*, 1(2009), 1-22.

Nolan, N. T., Seery, M. K., Hinder, S. J., Healy, L. F., Pillai, S., 2010, A systematic study of the effect of silver on the chelation formic acid to a titanium precursor and the resulting effect on the anatase to rutile transformation of TiO_2. *J. of Phys. Chem.*, 30(114), 1-10.

Ocwelwang, A. R., 2012, Photocatalytic activity and antibacterial properties of Ag/N-doped TiO_2 nanoparticles on PVAE-CS nanofiber support, *Disertasi*, Department of Pure and Apply Chemistry, Faculty of Science and Agriculture, University of Fort Hare, Alice.

Pathakoti, K., Morrow, S., Han, C., Pelaez, M., He, X., Dionvsiou, D. D., Hwang, H., 2013, Photoinactivation of escherichia coli by sulfur-doped and nitrogen–fluorine-codoped TiO_2 nanoparticles under solar simulated light and visible light irradiation, *Environ. Sci. Technol.*, 17(47), 9988-9996.

Pelczar, M. J. and Chan E. C. S., 1981, *Elements of Microbiology*, McGraw. Hill Book Company, Inc., New York.

Purwati, R., 2012, Kitosan-tiourea-Ag^{+} sebagai bahan antibakteri *Escherichia coli*, *Skripsi*, Departemen Kimia, Fakultas Matematika and Ilmu Pengetahuan Alam, Universitas Gadjah Mada, Yogyakarta.

Sarles, W.B., Frazier, W.C., Wilson, J.B., and Knight, S.G., 1956, *Microbiology General and Applied*, Edisi II, Harper & Brothers, New York.

Shakeel, A., Ahmad, M., and Ikram, S., 2014, Chitosan: A Natural Antimicrobial Agent- A Review, *J. Appl. Chem.*, 61(3), 493-503.

Sobana, N., Muruganadham, M., and Swaminathan, M., 2006, Nano-Ag particles doped TiO2 for efficient photodegradation of Direct azo dyes, *J. Mol. Catal. A: Chem*, 9(258), 124-132.

Suriawiria, U., 1996, *Mikrobiologi Air*, Edisi Kedua, Penerbit Alumni, Bandung.

Suwankar, M. B., Dhabbe, R. S., Kadam, A. N., and Garadkar, K. M., 2014, Enhanced photocatalytic activity of Ag doped TiO_2 nanoparticles synthesized by a microwave assisted method, *Ceram. Int*, 40(4), 5489-5496.

Tripathi, S., Mehrotra, G. and K., Dutta, P. K., 2009, Physicochemical and bioactivity of cross-linked chitosan–PVA film for food packaging applications, *Int. J. Biol. Macromol.*, 45(4), 372-376.

Vimala, K., 2011, Fabrication of curcumin encapsulated chitosan-PVA silver nanocomposite films for improved antimicrobial activity, *J. Biomater. Nanobiotechnol.*, 2(1), 55-64.

Wang, H., Zhang, R., Zhang, H., Jiang, S., Liu, H., Sun, M., and Jiang, S., 2015, Kinetics and functional effectiveness of nisin loaded antimicrobial packaging film based on chitosan/poly(vinyl alcohol), *Carbohydr. Polym*, 8(127), 64-71.

Xiao, J., Peng, T., Li, R., Peng, Z. and Yan, C., 2006, Preparation, phase transformation and photocatalytic activities of cerium-doped mesoporous titania nanoparticles. *J. Solid State Chem*, 4(179), 1161-1170.

Yang, D., Li, J., Jiang, Z., Lu, L., and Chen, X., 2009, Chitosan/TiO_2 nanocomposite pervaporation membranes for ethanol dehydration, *Chem. Eng. Sci.*, 13(64), 3130-3137.

Zainal, Z., Hui, L. K., Hussein, M. Z., Abdullah, A. H., and Hamadneh, I. R., 2009, Characterization of TiO2–Chitosan/Glass photocatalyst for the removal of

a monoazo dye via photodegradation–adsorption process, *J. Hazard. Mater.*, 164 (1), 138-145.