

DAFTAR PUSTAKA

- Abdou, E.S., and Sorour, M.A., 2014, Preparation and Characterization of Starch/Carrageenan Edible Films, *Int. J. Food Res.*, 21(1): 189-193.
- Agnihotri, S.A., Aminabhavi, T.M., 2004, Recent Advance on Chitosan Based Micro and Nanoparticles in Drug Delivery, *J. Controlled Release*, P. 6-18.
- Agoes, G., 2008, *Pengembangan Sediaan Farmasi*, Seri Farmasi Industri-1, Penerbit ITB, Bandung.
- Anggraeni, F.D., 2011, Karakterisasi Edible Film dan Kapsul Berbahan Dasar Pati Sagu dengan Penambahan Gliserol dan Karaginan, *Tesis*, Program Studi Ilmu dan Teknologi Pangan, Universitas Gadjah Mada, Yogyakarta.
- Ansel, H.C., 1989, *Pengantar Bentuk Sediaan Farmasi*, Edisi 4, UI Press, Jakarta.
- Ansel, H.C., 2005, *Pengantar Bentuk Sediaan Farmasi*, Edisi Keempat, UI Press, Jakarta, Hal. 217-218.
- Antoniewski, M.N., S.A. Barringer, C.L. Knipe and H.N. Zerby, 2007, Effect of A Gelatin Coating on the Shelf Life of Fresh Meat, *J. Food Sci*, 72: E382-387.
- Bae, H.J., D.S. Cha., W.S. Whiteside dan H. J. Park, 2008, Film and Pharmaceutical Formation Properties of Mungbean, Waterchesnut, and Sweet Potato Starches, *Food Chem*, 106: 96-105.
- Bailey, A.J., and Paul, 1998, Mechanisms of Maturation and Ageing of Collagen, *J. Soc. Leather Technol. Chem.*, PP. 104-110, 6.
- Bailey, A.J., Paul, R.G., and Knott, L., 2008, Mechanism of Maturation and Ageing of Collagen, *Mech Aging. Dev*, 106: 1-56.
- Barbane, P., Peniche, C., and Argeuelles-Monal, W., 2005, Swelling Behavior of Chitosan/Pectin Polyelectrolyte Complex Membranes Effect of Thermal Crosslinking, *Polym. Bull.*, 55, 367-375.
- Bartkowiak, A., dan Hunkeler, D., 2001, Carrageenan-oligochitosan Microcapsules: Optimization of the Formation Process, *Coll. Surf. B Biointerfaces*, 21, 285-298.
- Beppu, M.M., Vieira, R.S., Aimoli, C.G., and Santana, C.C., 2007, Crosslinking of Chitosan Membranes Using Glutaraldehyde: Effect on Ion Permeability and Water Absorbtion, *J. Membrane Sci.*, 301, 126-30.

- 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, 19-34.
- Bowes, J.H., Elliot, R.G., and Moss, J.A., 1955, The Composition of Collagen and Acid-Soluble Collagen of Bovine Skin, *Biochem. J.*, 61, 143-150.
- Briones, A, V., and Sato, T., 2010, Encapsulation of Glucose Oxidase (GOD) in Polyelectrolyte Complexes of Chitosan-Carrageenan, *React. Func. Polym.*, 70, 19-27.
- Campo, V.L, Kawano, D.F, Silva Junior, D.B., and Carvalho, I., 2009, Carrageenans: Biological Properties, Chemical Modifications and Structural Analysis, *Carbohydr Polym.*, 77,167-180.
- Caner, C., Vergano, P.J., and Wiles, J.L., 1998, Chitosan Film Mechanical and Permeation Properties as Affected by Acid, Plasticizer and Storage, *J. Food Sci.*, (63), 1049-1053.
- Carneiro, T.N., Novaes, D.S., Rabelo, R.B., Celebi, B., Chevalier, P., Mantovani, D., and Vieira, R.S., 2013, BSA and Fibrinogen Adsorption on Chitosan/ κ -Carrageenan Polyelectrolyte Complexes, *Macromol. Bio. Sci.*, 13, 1072-1083.
- Cha, D.S., Jin, H.C., Manjeet, S.C., Hyun, J.P., 2002, Antimicrobial Films Based on Na-Alginate and K-Carrageenan, *Lebensm. Wiss u. Technol.*, 35, 715-719.
- Chang, K.L.B dan Lin, J., 2000, Swelling Behavior and the Release of Protein from Chitosan-Pectin Composite Particles, *Carbohydr. Polym.*, 43, 163-169.
- Chang, K.L.B., Tsai, G., Lee, J., and Fu, W., 1997, Heterogeneous N-Deacetylation of Chitin in Alkaline Solution, *Carbohydr. Res.*, 303, 327-332.
- Chaplin, M., 2006, *Gelatine*, <http://www.isbu.ac.uk/water/index2.html>.
- De Oliveira, H.C.L., Fonseca, J.L.C., and Pereira, M.R., 2008, Chitosan-Poly(Acrylic Acid) Polyelectrolyte Complex Membranes: Preparation, Characterization and Permeability Studies, *J. Biomat. Sci-Polym. E.*, 19, 143-60.
- Dellman, H.D., and Brown, E.M., 1989, *Buku Teks Histologi Veteriner*, Penerbit Universitas Indonesia, Jakarta.

- Dhanapal, A., Sasikala, P., Rajamani, L., Kavitha, V., Yazhini, G.M., Banu, S., 2012, Edible Film from Polysaccharides, *J. Food Sci.*, 3, ISSN 2224-6088, 9-18.
- Distantina, S., Rochmadi, R., Fahrurrozi, M., and Wiratni, W., 2013, Preparation and Characterization of Glutaraldehyde-crosslinked κ -Carrageenan Hydrogel, *Eng. J.*, 17, 57-66.
- El-Aassar, M.R., El-Fawal, G.F., Kamoun, E.A., Fouda, M.M.G., 2015, Controlled Drug Release from Crosslinked K-Carrageenan/Hyaluronic Acid Membranes, *Int. J. Biol. Macromol.*, 77, 322-329.
- Espitia, P.J.P., Du, W.X., Avena-Bustillos, R.J., Soares, N.F.F., and McHugh, T.H., 2014, Edible Film from Pectin: Physical-Mechanical and Antimicrobial Properties – A Review, *J. Food Hydrocoll*, 35, 287-296.
- Feng, T., Du, Y., Li, J., and Wei, Y., 2007, Antioxidant Activity of Half N-Acetylated Water-Soluble Chitosan in Vitro, *Eur. Food Res. Technol*, 225: 133-138.
- Fernandez-Kim, S.O., 2004, Physicochemical and Functional Properties of Crawfish Chitosan as Affect by Different Processing Protocols, *Thesis*, Department of Food Science, Soul National University.
- Fessenden and Fessenden, 1986, *Kimia Organik*, Jilid II, Edisi III, alih bahasa Aloysius Handayana Pudjaatmaka, Ph.D, Erlangga: Jakarta.
- Fisher, G.J., Quan, T., Purohit, T., Shao, Y., Cho, M.K. and He, T., 2009, Collagen Fragmentation Promotes Oxidative Stress and Elevates Matrix Metalloproteinase 1 in Fybroblasts in Aged Human Skin, *Am. J. Phys.*, 174 (1): 101-114.
- Gadri, A., Priani, S.E., 2012, Stabilitas Kadar dan Laju Disolusi Ketoprofen dalam Sediaan Kapsul Gelatin dan HPMC-Karaginan, *Prosiding SnaPP*, 3, 87-94.
- Ganji, F., Vasheghani-Farahani, S., dan Vasheghani-Faharani, E., 2010, Theoretical Description of Hydrogel Swelling: A Review, *Iran. Polym. J.*, 19 (5), 375-398.
- Garcia, M.A., Martino, M.N., and Zaritzky, N.E., 2000, Microstructural Characterization of Plasticized Starch-Based Films, *Starch/Starke*, 52, 118-124.
- Gennadios, A., 2002, *Protein-Based Films and Coatings*, CRC Press, New York.
- Gennadios, A., and Weller, C.L., 1990, Edible Film Coatings from Wheat and Corn Protein, *J. Food Tech*, 44 (10), 63-68.

- Gennaro, R.A., 2000, *Remington: The Science and Practice of Pharmacy 20th Edition*, New York: Lippincott Williams & Wilkins.
- Gimenez, B., Turnay, J., Lizarbe, M.A., Montero, P., and Gomez-Guillen, M.C., 2005, Use of Lactic Acid for Extraction of Fish Skin Gelatin, *J. Food Hydrocoll.*, 19, 941-950.
- Giri, T.K., Thakur, A., Alexander, A., Ajazuddin, Badwaik, H., dan Tripathi, D.K., 2012, Modified Chitosan Hydrogels as Drug Delivery and Tissue Engineering System: Present Status and Applications, *Acta Pharm. Sin. B*, 1-11.
- Glicksman, M., 1982, *Food Hydrocolloids*, Boca Raton: CRC Press, Inc. 83-92.
- Glicksman, M., 1983, Seaweeds Extracts (Agar, Carrageenan, Furcellaran), *Food Hydrocolloid*, Volume II, CRC Press Inc, Boca Raton.
- Gontard, N., Guilbert, S., and Cuq, J.L., 1993, Water and Glyserol A Plasticizer Affect Mechanical and Water Vapor Barrier Properties of Inedible Wheat Gluten Film, *J. Food Sci.*, (58), 190-195.
- Imeson, A., 1992, *Thickening And Gelling Agents For Food*, Aspen, New York.
- Irianto, H.E., Susanti, A., Darmawan, M., Syamdidi, 2005, Pembuatan Edible Film dari Komposit Karaginan, Tepung Tapioka dan Lilin Lebah, *Jurnal Penelitian Perikanan Indonesia*, 11(2): 93-101.
- Istini, S., A. Zalnika dan Suhaimi, 2007, Manfaat dan Pengolahan Rumput Laut, Deputi Pengkajian Ilmu Dasar dan Terapan, BPP Teknologi, Jakarta.
- Jayakumar, R., Menon, D., Manzoor, K., Nair, S.V., and Tamura, H., 2010, Biomedical Applications of Chitin and Chitosan Based Nanomaterials – A Short Review, *Carbohydr Polym.*, 82(2): 227-232.
- Jones, B.E., 2008, Hard Capsule, *Encyclopedia of Pharmaceutical Technology*.
- Karim, A.A. and Rajeev, B., 2008, Gelatine Alternatives for Food Industry: Recent Developments, Challenges and Prospect., *J. Trends Food Sci. Technol.*, 19: 644-656.
- Karim, A.A., and Bhat, R., 2008, Fish Gelatin: Properties, Challenges, and Prospect as An Alternative to Mammalian Gelatins, *Food Hydrocoll.*, 23, 563-576.
- Keeton, J.T., 2001, *Formed and Emulsion Product. In: Poultry Meat Processing*. A.R. Shams (Ed), CRC Press, Boca Raton.

- Kester and Fennema, 1986, Edible Films and Coating: Characteristics and Properties, *Int. J. Food Res.*, 15(3): 237-248.
- Killincceker, O., Dogan, I.S., and Kucukoner, E., 2009, Effects of Edible Coatings on the Quality of Frozen Fish Fillets, *J. Food Sci. Technol.*, 42: 868-873.
- Kim, S.J., and Ustunol, Z., 2001, Thermal Properties Head Seal Ability and Seal Attributes of Whey Protein Isolate Lipid Emulsion Edible Film, *J. Food Sci.*, 66(7), 985-990.
- Kizilay, E., Kayitmazer, A.B., and Dubin, P.L., 2011, Complexation and Coacervation of Polyelectrolyte with Oppositely Charged Colloids, *Adv. Colloid Interfac.*, 167, 24-37.
- Knoor, D., 1982, Function Properties Chitin and Chitosan, *J. Food Sci.*, 48, 36-41.
- Kolodziejska, I., Wojtasz-Pajak, A., Ogonowska, G., and Sikorski, Z.E., 2000, Deacetylation of Chitin in Two-Stage Chemical and Enzymatic Process, *Bull Sea Fish Inst.*, 150, 15-24.
- Kramarenko, E.Y., Khokhlov, A.R., and Reineker, P., 2006, Stoichiometric Polyelectrolyte Complexes of Ionic Block Copolymer and Oppositely Charged Polyions, *J. Chem. Phys.*, 125, 194902.
- Krochta, J. M., E.A. Baldwin and M. O. Nisperos-Carriedo, 1994, *Edible Coating and Film to Improve Food Quality*, Technomic Publishing Company, New York.
- Krochta, J.M., 1997, Edible and Biodegradable Polymer Films: Challenges and Opportunities, *J. Food Tech.*, 51:61.
- Krochta, J.M., and Mulder-Johnston, C., 1997, Edible and Biodegradable Polymer Film: Challenges and Opportunities, *J. Food Tech*, 51(2), 61-74.
- Kumar, M.N., Muzzarelli, R.A., Muzzarelli, C., Sashiwa, H. and Domb, A.J., 2004, Chitosan Chemistry and Pharmaceutical Perspectives, *Chem.Rev.*, 104, 6017-6084.
- Kurita, K., 2005, Chitin and Chitosan: Functional Biopolymers from Marine Crustaceans, *J. Mar. Biotechnol.*, 8: 203-226.
- Lee, C.H., Singla, A., and Lee, Y., 2001, Biomedical Applications of Collagen, *Int. J. Pharm.*, 22: 1-22.
- Leuenberger, B.H., 1991, Investigations of Viscosity and Gelation Properties of Different Mammalian and Fish Gelatins, *Food Hydrocoll.*, 5 (4), 353-361.

- Li, C., Hein, S., Dan Wang, K., 2013, Chitosan-Carrageenan Polyelectrolyte Complex for the Delivery of Protein Drugs, *Isrn Biomat.*, 1-6.
- Liu, H.Y., Han, J., and Guo, S.D., 2008, Characteristics of the Gelatin Extracted from Channel Catfish (*Ictalurus Punctus*) Head Bones, *J. Food Sci. Tech.*, 43: 313-317.
- Mali, S., Grossman, M.V.E., Garcia, M.A., Martino, M.N., and Zaritzky, N.E., 2005, Mechanical and Thermal Properties of Yan Starch Film, *Food Hydrocoll.*, (19), 157-164.
- Mali, S., Grossmann, M.V.E., Garcia, M.A., Martino, M.N., and Zaritzky, N.E., 2008, Antiplasticizing Effect of Glycerol and Sorbitol on the Properties of Cassava Starch Film, *Food Hydrocoll.*, 19: 157-164.
- Martins, J.T., Cerqueira, M.A., Bourbon, A.I., Pinheiro, A.C., Souza, B.W.S., Vicente, A.A., 2012, Synergistic Effects between K-Carrageenan and Locust Bean Gum on Physicochemical Properties of Edible Films Made Thereof, *Food Hydrocoll.*, 29: 280-289.
- Marudova, M.G., Zsivanovits, G., Popchev, I.G., Petrovska, I.P., Angelopoulos, A., and Fildis, T., 2010, Preparation and Evaluation of Carrageenan/Chitosan Multilayer Beads, *CP1203 7th International Conference of the Balkan Physical Union*, 783-788.
- Mc Hugh and Krochta, 1994, Sorbitol vs Glycerol Plasticized Whey Protein Edible Film: Integrated Oxygen Permeability and Tensile Strength Evaluation, *J. Agric. Food Chem.*, 42(4).
- McHugh, T.H., Avena, B.R., and Krochta, J.M., 1993, Hydrophilic Edible Films: Modified Procedure for Water Vapor Permeability and Explanation of Thickness Effects, *J. Food Sci.*, 58(4), 899-903.
- Meyers, S.P., No, H.K., Prinyawiwatkui, W., and Xu, Z., 2007, Applications of Chitosan for Improvement of Quality and Shelf Life of Foods: A Review, *J. Food Sci.* 72(5): 87-100.
- Mi, F., Sung, H., and Shyu, S., 2002, Drug Release from Chitosan-Alginate Complex Beads Reinforced by A Naturally Occuring Cross-Linking Agent, *Carbohyd. Polym.*, 48, 61-72.
- Miekka, R.G., 1961, Polycation-Polyanion Complexes: Preparation and Properties of Poly(vinylbenzil-trimethyl ammonium)-Poly(styrene sulfonate), *Tesis*, Department of Chemical Engineering, Massachusetts Institute of Technology, Amerika Serikat.

- Mikkonen, K.S., Rita, H., Helen, H., Talja, R.A., Hyvonen, L., and Tenkanen, M., 2007, Effect of Polysaccharide Structure on Mechanical and Thermal Properties of Galactomannan-Based Films, *Biomacromolecules*, 8, 3198-3205.
- Mitsumata, T., Suemitsu, Y., Fujii, K., Fujii, T., Taniguchi, T., and Koyama, K., 2003, pH-Response of Chitosan, K-Carrageenan, Carboximethyl Cellulose Sodium Salt Complex Hydrogels, *Polym.*, 44, 7103-7111.
- Morris, G.A., Castile, J., Smith, A., Adams, G.G., and Harding, S.E., 2009, Macromolecular Conformation of Chitosan in Dilute Solution: A New Global Hydrodynamic Approach, *Carbohydr. Polym.*, 76, 616-621.
- Morris, G.A., Kok, M.S., Harding, S.E., and Adam, G.A., 2010, Polysaccharide Drug Delivery System Based on Pectin and Chitosan, *Biotechnol. Genet. Eng. Rev.*, 27, 257-84.
- Nanaki, S., Karavas, E., Kalantzi, L., Bikiaris, D., 2010, Miscibility Study of Carrageenan Blends and Evaluation of Their Effectiveness as Sustained Release Carriers, *Carbohydr. Polym.*, 79, 1157-1167.
- Narajadah, K., 2005, Development and Characterization of Antimicrobial Edible Film from Crawfish Chitosan, *Desertation in Department of Food Science*, University of Paradeniya.
- Nhari, R.M.H.R., Ismail, A., dan Che Man, Y.B., 2012, Analytical Methods for Gelatine Differentiation from Bovine and Porcine Origins and Food Products, *J. Food Sci.*, 77: R42-46.
- Ockerman, H.W dan Hansen, C.L., 2000, *Animal By Product Processing And Utilization*, CRC Press, USA.
- Oktari, L.R., 2014, Pembuatan Film Komposit Kompleks Polielektrolit Kitosan/K-Karaginan dan Pemanfaatannya sebagai Adsorben Metilen Biru, *Tesis*, Jurusan Kimia, Universitas Gadjah Mada, Yogyakarta.
- Pal, K., Banthia, A.K. and Mujamdar, K., 2009, Polymeric Hydrogels: Characterization and Biomedical Application – A Mini Review, *Design Monomer and Polymers*, 12, 197-200.
- Park, H.J., Weller, C.L., Vergano, P.J., and Testin, R.F., 1993, Permeability and Mechanical Properties of Cellulose-Based Edible Film, *J. Food Sci.*, 58(6), 1361-1370.
- Park, J.W., Testin, R.F., Park, H.J., Vergano, V.J., and Weller, C.L., 1994, Fatty Acid Concentration Effect on Tensile Strength, Elongation, and Water Vapor Permeability of Laminated Edible Films, *J. Food Sci.*, 59(4), 916-919.

- Park, J.W., Whiteside, W.S., Cho, S.Y., 2008, Mechanical and Water Vapor Barrier Properties of Extruded and Heat-Pressed Gelatine Films, *LWT* 41: 692-700.
- Park, S.Y., Lee, B.I., Jung, S.T., and Park, H.J., 2001, Biopolymer Composite Films Based on (K)-Carrageenan and Chitosan, *Mater. Res. Bull.*, 36(3-4), 511-519.
- Phillips, G.O., and Williams, P.A., 2000, *Handbook of Hydrocolloids*, Pp. 1-19, Woodhead Publishing Limited, Cornwall.
- Pinheiro, A.C., Bourbon, A.I., de S. Medeiros, B.G., da Silva, L.H.M., da Silva, M.C.H., da Cunha, M.G.C., Coimbra, M.A., dan Vicenre, A.A., 2012, Interactions between k-Carrageenan and Chitosan in Nanolayered Coatings-Structural and Transport Properties, *Carbohydr. Polym.*, 87, 1081-1090.
- Piyakulat, P., Prapharaksit, N., Chantarasiri, N., and Muangsin, N., 2007, Preparation and Evaluation of Chitosan/Carrageenan Beads for Controlled Release of Sodium Diclofenac, *Aaps Pharm. Sci. Tech.*, 4, 8, 1-11.
- Poppe, J., 1992, Gelatin in Imeson, A., (Ed.), *Thickening and Gelling Agents for Food*, London: Blackie Academic and Professional.
- Ravindra, B.D., Archana, D.K., Vandana, K.M., and Manisha, H.J., 2012, Advancement in Manufacturing of Non-Gelatin Capsule Shell, *Int. J. Pharm. Res.*, 3, 1178-1187.
- Rhim, W.J., Wu, Y., Weller, C.L., and Schnept, M., 1999, Physical Characteristics of A Composite Film of Soy Protein Isolate and Propylenglycol Alginate, *J. Food Sci.*, 64, 149-152.
- Rinaudo, M., 2006, Chitin and Chitosan: Properties and Applications, *Prog. Polym. Sci.*, 31, 603-632.
- Rivero, S., Garcia, M.A., and Pinotti, A., 2009, Composite and Bi-Layer Films Based on Gelatine and Chitosan, *J. Food Eng.*, 90 (3), 531-539.
- Roberts, M.A. and B. Quemener, 1999, Measurement of Carrageenans in Food: Challenges, Progress, and Trends in Analysis, *Trends Food Sci. Tech.*, 10: 169-181.
- Romero-Bastida, C.A., Bello-Perez, L.A., Garcia, M.A., Martino, M.N., Solos Zaferia, J., and Zaritzky, N.E., 2005, Physicochemical and Microstructural Characterization of Film Prepared by Thermal and Cold Gelatinization from Non Conventional Source of Starches, *Carbohydr. Polym.*, 60, 235-244.

- Saether, V.H., Holme, H.K., Maurstad, G., Smidsrød, O., and Stokke, B.T., 2008, Polyelectrolyte Complex Formation Using Alginate and Chitosan, *Carbohydr. Polym.*, 74, 813-821.
- Sahidi, F., Arachchi, J.K.V., and Y.J. Jeon, 1999, Food Application of Chitin and Chitosans, *Trends Food Sci. Tech.*, 10, 37-51.
- Sahilah, A.M., Mohd. Fadly, L., Norrakiah, A.S., Aminah, A., Wan Aida, W.M., Ma'ruf, A.G. dan Mohd. Khan, A., 2012, Halal Market Surveillance of Softand Hard Capsules in Pharmaceutical Products Using PCR and Southern Hybridation on the Biochip Analysis, *Int. J. Food Res.*, 19(1): 371-375.
- Said, M.I., 2011, Optimasi Proses Produksi Gelatin Kulit Kambing sebagai Bahan Baku Edible Film untuk Bahan Pengemas Obat (Kapsul), *Disertasi*, Program Pascasarjana FPT UGM, Yogyakarta.
- Salgueiro, A.M., Daniel-da-silva, A.L., Girao, A.V., Pinheiro, P.C., and Trindade, T., 2013, Unusual Dye Adsorption Behavior of κ -Carrageenan Coated Superparamagnetic Nanoparticles, *Chem. Eng. J.*, 229, 276-284.
- Sankalia, M.G., Mashru, R.C., Sankalia, J.M., and Sutariya, V.B., 2007, Reversed Chitosan-Alginate Polyelectrolyte Complex for Stability Improvement of Alpha-Amylase Optimization Physicochemical Characterization, *Eur. J. Pharm. Biophar.*, 65 (2), 215-232.
- Santo, E., Mano, F., Grenha, A., Gomes, M.E., Neves, N.M. and Reis, R.L., 2009, Development of New Chitosan / Carrageenan Nanoparticles for Drug Delivery Application, *J. Biomed. Mater. Res. Part A*, 1265-1272.
- Savant, V., 2001, Protein Adsorption on Chitosan-Polyanion Complexes: Application to Aqueous Food Processing Wastes, *Tesis*, Department of Food Science and Technology, Oregon State University, Amerika Serikat.
- Schipunov, Y.A., and Postnova, I.V., 2009, Water Soluble Polyelectrolyte Complex of Oppositely Charges Polysaccharides, *Compos, Interface*, 16, 251-279.
- Shi, M.X., Cai, Q.F., Yao, L.M., Y.B., Ming, Y.L., dan Ouyang, G.L., 2006, Antiproliferation and Apoptosis Induced by Curcumin in Human Ovarial Cancer Cells, *Cell Biology International Reports*, 30, 221-226.
- Shovsky, A., 2011, Polyelectrolyte Complexes of Bottle Brush Copolymer: Solution and Adsorption Properties, *Doctoral Thesis*, Chemical Science and Engineering, Royal Institute of Technology Stockholm, Sweden.
- Shumilina, E.V., and Shchipunov, Y.A., 2002, Chitosan-Carrageenan Gels, *Colloids. J.*, 64, 372-378.

- Simelane, S., and Ustunol, Z., 2005, Mechanical Properties of Heat Cured Whey Protein Based Edible Film Compared with Collagen Casing Under Sausage Manufacturing Condition, *J. Food Sci*, 70 (2), E.131 – E.134.
- Singh, S., Rao, K.V.R., Venugopal, K., Manikandan, R., 2002, Alteration in Dissolution Characteristics of Gelatin-Containing Formulations: A Review of the Problem, Test methods, and Solutions, *Pharm. Tech.*, 26 (4): 36-58.
- Sinha, V.R., Singla, A.K., 2004, Chitosan Microsphere as A Potential Carrier for Drugs, *Int. J. Pharm.*, 274, P. 1-33.
- Sobral, P.J.A., and Habitante, A.M.Q.B., 2001, Characteristics and Gel Properties of Gelatin from Skin of Seabass (*Lates calcarifer*) as Influenced by Extraction Conditions, *Food Chem.*, 152, 276-284.
- Sompie, M., Mirah, A.D., Linda, C.H., Karisoh, M., 2015, Pengaruh Perbedaan Suhu Ekstraksi terhadap Karakteristik Gelatin Kulit Kaki Ayam, *Pros Sem Nas Masy Biodiv Indon*, 1 (4): 792-795.
- Sugita, P., Wukirsari, T., Sjahriza, A., dan Wahyono, D., 2009, *Kitosan: Sumber Biomaterial Masa Depan*, Penerbit IPB Press, Bogor.
- Sukma, S., Lusiana, S.E., Masruri, Suratmo, 2014, Kitosan dari Rajungan Lokal *Portunus Pelagicus* Asal Probolinggo, Indonesia, *Jurnal Kimia*, 2 (2): PP506-512.
- Tamaela, P., and Lawerissa, S., 2008, Karakteristik Edible Film dari Karaginan, *Ichtyos*, 7(1), 27-30.
- Van De Velde, F., Knutsen, S.H., Usov, A.I., Romella, H.S., and Carezo, A.S., 2002, ^1H and ^{13}C High Resolution NMR Spectroscopy of Carrageenans: Application in Research and Industry, *Trends Food Sci. Tech.*, 13, 73-92.
- Vanin, F.M., Sobral, P.J.A., Menegalli, F.C., Carvalho, R.A., and Habitante, A.M.Q.B., 2005, Effect Plasticizer and Their Concentrations on Thermal and Functional Properties of Gelatin-Based Film, *Food Hydrocoll*, 19: 899-907.
- Villanueva, R.D., Mendoza, W.G., Rodriguez, M.R.C., Romero, J.B., Montano, M.N.E., 2004, Structure and Functional Performance of Gigartinacean Kappa-Iota Hybrid Carrageenan and Solieriacean Kappa-Iota Carrageenan Blends, *Food Hydrocoll*, 18 (2): 283-292.
- Wahyuningtyas, D., 2015, Pengaruh Gliserol terhadap Karakteristik Edible Film dari Pektin sebagai Drug Delivery System, *Tesis*, Program Studi Teknik Kimia, Universitas Gadjah Mada.

- Wang, X., Sun, X., Liu, H., Li, M., and Ma, Z., 2011, Barrier and Mechanical Properties of Carrot Pure Films, *Food Biopro. Proc.*, 89, 149-156.
- Were, L., Hettiarachchy, N.S., and Coleman, M., 1999, Properties of Cysteine-Added Soy Protein-Wheat Gluten Films, *J. Food Sci.*, (64), 514-518.
- Wu, F.C., Tseng, R.I., and Juang, R.S., 2002, Adsorption of Dyes and Humic Acid from Water Using Chitosan-Encapsulated Activated Carbon, *J.Chem. Technol.*, 77, 1269-1279.
- Wu, P., and Imai, M., 2012, *Novel Biopolymer Composite Membrane Involved with Selective Mass Transfer and Excellent Water Permeability*, Graduate School of Bioresource Sciences, Nihon University, Japan.
- Yoshida, C.M.P., Junior, E.N.O., and Franco, T.T., 2009, Chitosan Tailor-Made Films: The Effects of Additives on Barrier and Mechanical Properties, *Packaging Technology and Science*, 22, 161-170.
- Yoshizawa, T., Shinya, Y., Hong, K.J., and Kajiuci, T., 2005, pH and Temperature Sensitive Release Behaviors from Polyelectrolyte Complex Films Composed of Chitosan and Paoma Copolymer, *Eur. J. Pharm. Biopharm.*, 59, 307-13.
- Yuguchi, Y., Thuy, T.T., Urakawa, H., Kajiwara, K., 2002, Structural Characteristics of Carrageenan Gels: Temperature and Concentration Dependence, *Food Hydrocoll*, 16: 515-522.
- Yustitia, D., 2014, Preparasi Membrane Kompleks Polielektrolit Kitosan/K-Karaginan dan Aplikasinya untuk Transport Kreatinin, *Tesis*, Program Studi S2 Ilmu Kimia, Universitas Gadjah Mada, Yogyakarta.
- Zhang, Y., and Han, J.H., 2006a, Plasticization of Pea Starch Film with Monosaccharides and Polyols, *J. Food Sci.*, 7(6), 253-261.
- Zhang, Y., and Han, J.H., 2006b, Mechanical and Thermal Characteristics of Pea Starch Film Plasticized with Monosaccharides and Polyols, *J. Food Sci.*, 71(2), 109-118.