



DAFTAR PUSTAKA

- Abdeltwab, W.M., Y.F. Abdelaliem, W.A. Metry, and M. Eldeghedy. 2019. Antimicrobial effect of chitosan and nano-chitosan against some pathogens and spoilage microorganisms. *Journal of Advanced Laboratory Research in Biology*. 10(1): 8-15.
- Abhirama, N.P., P.S. Nugraheni, and W. Budhijanto. 2019. Effectiveness of chitosan-tripolyphosphate nanoparticle dispersion in ice for fresh tilapia fish (*Oreochromis niloticus*) preservation. *AIP Conference Proceedings* 2085. 020035: 1-7.
- Aguayo, P.R., T.B. Larenas, C.A. Godoy, B.C. Rivas, J. Gonzalez-Casanova, D. Rojas-Gomez, and N.C. Fuentes. 2020. Antimicrobial and antibiofilm capacity of chitosan nanoparticles against wild type strain of *Pseudomonas* sp. isolated from milk of cows diagnosed with bovine mastitis. *Antibiotics*. 9(551): 1-15.
- Atanasova, K.R. 2010. Interactions between porcine respiratory coronavirus and bacterial cell wall toxins in the lungs of pigs. Faculty of Veterinary Medicine. Ghent University. Thesis.
- Avadi, M.R., A.M.M. Sadeghi, N. Mohammadpour, S. Abedin, F. Atyabi, R. Dinarvand, M.R. Tehrani. 2010. Preparation and characterization of insulin nanoparticles using chitosan and Arabic gum with ionic gelation method. *Nanomedicine* 6:58-63.
- Azeredo, J., N. F. Azevedo, R. Briandet, N. Cerca, T. Coenye, A. R. Costa, M. Desvaux, G. D. Bonaventura, M. Hebraud, Z. Jaglic, M. Kacaniova, S. Knochel, A. Lourenco, F. Mergulhao, R. L. Meyer, G. Nychas, M. Simoes, O. Tresse and C. Sternberg. 2017. Critical review on biofilm method. *Critical reviews in microbiology*. 43(3): 313-351.
- Badan Standardisasi Nasional. 2009. SNI 7388:2009 Batas maksimum cemaran mikroba dalam pangan. Standar Nasional Indonesia.
- Behnke, S., A.E. Parker, D. Woodall, and A.K. Camper. 2011. Comparing the chlorine disinfection of detached biofilm clusters with those of sessile biofilms and planktonic cells in single- and dual-species cultures. *Applied and Environmental Microbiology*. 77(20): 7176-7184.
- Bennett, S.D., K.A. Walsh, and L.H. Gould. 2013. Foodborne disease outbreaks caused by *Bacillus cereus*, *Clostridium perfringens*, and *Staphylococcus aureus*—United States, 1998–2008. *Food Safety*. 57(3): 425-433



Bhumkar, D.R. and V.B. Pokharkar. 2006. Studies on effect of ph on cross-linking of chitosan with sodium tripolyphosphate: a technical note. AAPS PharmSciTech. 7(2): 1-6.

Bonsaglia, E.C.R., N.C.C. Silva, A.F. Junior, J.P.A. Junior, M.H. Tsunemi, and V.L.M. Rall. 2013. Production of biofilm by *Listeria monocytogenes* in different materials and temperatures. Food Control.

Bragadeeswaran, S., R. Jeevapriya, K. Prabhu, S.S. Rani, S. Priyadharsini, and T. Balasubramanian. Exopolysaccharide production by *Bacillus cereus* GU812900, a fouling marine bacterium. African Journal of Microbiology Research. 5(24): 4124-4132.

Campana, R., L. Casettari, L. Fagioli, M. Cespi, G. Bonacucina and W. Baffone. 2017. Activity of essential oil-based microemulsion against *Staphylococcus aureus* biofilm developed on stainless steel surface in different culture media and growth condition. International Journal of Food Microbiology 241: 132-140.

Ceri, H., M.E. Olson, C. Stremick, R.R. Read, D. Morck, and A. Buret. 1999. The calgary biofilm device: new technology for rapid determination of antibiotic susceptibilities of bacterial biofilms. Journal of Clinical Microbiology. 37(6): 1771-1776.

Cheng, Y., G. Feng and C. I. Moraru. 2019. Micro- and nanotopography sensitive bacterial attachment mechanism: a review. Frontiers in Microbiology 10: 1-17.

Christison, C.A., D. Lindsay, and A. Von Holy. 2007. Cleaning and handling implements as potential reservoirs for bacterial contamination of some ready-to-eat foods in retail delicatessen environments. Journal of Food Protection. 70(12): 2878-2883.

Chung, Y.C., Y.P. Su, C.C. Chen, G. Jia, H.L. Wang, J.C.G. Wu, and J.G. Lin. 2004. Relationship between antibacterial activity of chitosan and surface characteristics of cell wall. Acta Pharmacol Sin. 25(7): 932-936.

Coelho, S., S.M. Flores, J.L.T. Herrera, M.A.N. Coelho, M.C. Pereira, and S. Rocha. 2011. Nanostructure of polysaccharide complexes. Journal of Colloid and Interface Science. 363(2011): 450-455.

Daffonchio, D., J. Thaveesri, and W. Verstraete. 1995. Contact angle measurement and cell hydrophobicity of granular sludge from upflow anaerobic sludge bed reactors. Applied and Environmental Microbiology. 61(10): 3676-3680.



De Souza, E.L., Q.G.S. Meira, I.D.M. Barbosa, A.J.A.A. Athayde, M.L. De Conceicao, and J.P.D.S. Junior. 2014. Biofilm Formation by *Staphylococcus aureus* from food contact surfaces in a meat-based broth and sensitivity to sanitizers. Brazilian Journal of Microbiology. 45(1): 67-75.

Dos Santos, M.A. and A. Grenha. 2015. Polysaccharide nanoparticles for protein and peptide delivery: exploring less-known materials. Advances in Protein Chemistry and Structural Biology. 98: 223-261.

El Ghaouth, A., J. Arul, J. Grenier, N. Benhamou, A. Asselin, and R. Belanger. 1994. Effect of chitosan on cucumber plants: suppression of *Pythium aphanidermatum* and induction of defense reactions. Phytopathology. 84(3): 313-320.

Faille, C., T. Brauge, G. Leleu, A. Hanin, C. Denis, and G. Midelet. 2020. Comparison of the performance of the biofilm sampling methods (swab, sponge, contact agar) in the recovery of *Listeria monocytogenes* populations considering the seafood environment conditions. International Journal of Food Microbiology. 325: 1-7.

Fan, W. and W. Yan. 2012. Formation mechanism of monodisperse, low molecular weight chitosan nanoparticles by ionic gelation technique. Colloids and surface B: Biointerfaces. 90: 21-27.

Farber, R., I.B. Busheri, G. Chaniel, S. Rozenfeld, E. Bormashenko, V. Multanen, and R. Cahan. 2019. Biofilm grown on wood waste pretreated with cold low-pressure nitrogen plasma: utilization for toluene remediation. International Biodeterioration & Biodegradation. 139: 62-69.

Fletcher, M. 1977. The effects of culture concentration and age, time, and temperature on bacterial attachment to polystyrene. Canadian Journal of Microbiology. 23(1): 1-6.

Food and Drug Administration (FDA). 2009. FDA Report on the Occurrence of Foodborne Illness Risk Factors in Selected Institutional Foodservice, Restaurant, and Retail Food Store Facility Types. US Department of Health and Human Service.

Food and Drug Administration (FDA). 2012. *Bacillus cereus* and Other *Bacillus* spp. Bad Bug Book: Foodborne Pathogenic Microorganisms and Natural Toxins Handbook. 92-95.

Flemming, H.C. and J. Wingender. 2010. The biofilm matrix. Nature Reviews Microbiology. 8(9): 623-633.



Fu, F., L. Lin, and E. Xu. 2017. Functional pretreatments of natural raw materials. Advanced High Strength Natural Fibre Composites in Construction. 87-114.

Galie, S., C.G. Gutierrez, E.M. Miguelez, C.J. Villar, and F. Lombo. 2018. Biofilms in the food industry: health aspect and control methods. Frontiers in Microbiology. 9(898).

Golladay, S.W. and R.L. Sinsabaugh. 1991. Biofilm development on leaf and wood surfaces in a boreal river. Freshwater Biology. 25:437-450.

Greig, J.D. and A. Ravel. 2009. Analysis of foodborne outbreak data reported internationally for source attribution. International Journal of Food Microbiology. 130: 77-87.

Grenha, A. 2012. Chitosan nanoparticles: a survey of preparation methods. Journal of Drug Targeting. 20(4): 291-300.

Gumustas, M., C.T. Sengel-Turk, A. Gumustas, S.A. Ozkan, and B. Uslu. 2017. Effect of polymer-based nanoparticles on the assay of antimicrobial drug delivery systems. Multifunctional Systems for Combined Delivery, Biosensing and Diagnostics.

Harada, A.M.M. and M.S. Nascimento. 2021. Effect of dry sanitizing methods on *Bacillus cereus* biofilm. Brazilian Journal of Microbiology. 52: 919-926.

Harimawan, A., A. Rajasekar, and Y.P. Ting. 2011. Bacteria attachment to surfaces – AFM force spectroscopy and physicochemical analyses. Journal of Colloid and Interface Science. 364: 213-218.

Hariyadi, R.D. dan Cynthia. 2014. Inaktivasi bakteri patogen planktonik dan biofilm oleh sanitaiser komersial. Jurnal Mutu Pangan. 1(2): 110-117.

Hasan, A. 2006. Dampak penggunaan klorin. Jurnal Teknik Lingkungan. 7(1):90-96.

Houdt, R.V. and C. W. Michiels. 2010. Biofilm formation and the food industry, a focus on the bacterial outer surface. J. Appl. Microbiol. 109 : 1117 – 1131.

Hyde, F. W., M. Alberg and K. Smith. 1997. Comparison of fluorinated polymers against stainless steel, glass and polypropylene in microbial biofilm adherence and removal. Journal of Industrial Microbiology & Biotechnology 19: 142-149.



Ikono, R., A. Vibriani, I. Wibowo, K.E. Saputro, W. Muliawan, B.M. Bachtiar, E. Mardliyati, E.W. Bachtiar, N.T. Rochman, H. Kagami, L. Xianqi, T. Nagamura-Inoue, and A. Tojo. 2019. Nanochitosan antimicrobial activity against *Streptococcus mutans* and *Candida albicans* dual-species biofilms. BMC Research Notes. 12(383): 1-7.

Islam, S., M.A.R. Bhuiyan, and M.N. Islam. 2016. Chitin and chitosan: structure, properties and applications in biomedical engineering. Journal of Polymers and the Environment.

ISO 18593. 2004. Microbiology of food and animal feeding stuffs – horizontal methods for sampling techniques from surface using contact plates and swabs. ISO. Switzerland.

Iwamoto, M., T. Ayers, B.E. Mahon, and D.L. Swerdlow. 2010. Epidemiology of seafood-associated infections in the United States. Clinical Microbiology Reviews. 23(2): 399-411.

Jahandideh, A., M. Ashkani, N. Moini. 2021. Biopolymers in textile industries. Iran Polymer and Petrochemical Institute. Chapter 8. 193-218.

Jessen, B. and L. Lammert. 2003. Biofilm and disinfection in meat processing plants. International Biodeterioration & Biodegradation. 51:265-269.

Jesus, R.D. and G. Dedeles. 2020. Data on quantitation of *Bacillus cereus* sensu lato biofilms by microtiter plate biofilm formation assay. Data in Brief. 28: 1-5.

Jiao, Y., G.D. Cody, A.K. Harding, P. Wilmes, M. Schrenk, K.E. Wheeler, J.F. Banfield, and M.P. Thelen. 2010. Characterization of extracellular polymeric substances from acidophilic microbial biofilms. Applied and Environmental Microbiology. 76(9): 2916-2922.

Jory, D.E. 2000. Chlorine and fish processing. Global Aquaculture Advocate.

Karunakaran, E. and C.A. Biggs. 2011. Mechanisms of *Bacillus cereus* biofilm formation: an investigation of the physicochemical characteristics of cell surfaces and extracellular proteins. Appl Microbiol Biotechnol. 89: 1161-1175.

Kasai, M.R. 2009. Various methods for determination of the degree of N-acetylation of chitin and chitosan: a review. Journal of Agricultural and Food Chemistry. 57(5): 1667-1676.



Kean, T. and M. Thanou. 2010. Biodegradation, biodistribution and toxicity of chitosan. Advanced Drug Delivery Reviews. 62: 3-11.

Kim, J., B. Pitts, P.S. Stewart, A. Camper, and J. Yoon. 2008. Comparison of the antimicrobial effects of chlorine, silver ion, and tobramycin on biofilm. Antimicrobial Agents And Chemotherapy. 52(4): 1446-1453.

Kreuter, J. 2001. Nanoparticulate systems for brain delivery of drugs. Advanced Drug Delivery Reviews. 47(2001): 65-81.

Kurita, K. 1997. Chemistry and application of chitin and chitosan. Polymer Degradation and Stability. 59: 117-120.

Lee, J. S., Y. M. Bae, S. Y. Lee and S. Y. Lee. 2015. Biofilm formation of *staphylococcus aureus* on various surfaces and their resistance to chlorine sanitizer. Journal of Food Science. 80(10) : 2279 – 2286.

Lewis, K. 2001. Riddle of biofilm resistance. Antimicrobial Agents and Chemotherapy. 45(4): 999-1007.

Li, M., W. Wang, W. Fang, and Y. Li. 2013. Inhibitory effects of chitosan coating combined with organic acids on *Listeria monocytogenes* in refrigerated ready-to-eat shrimps. Journal of Food Protection. 76(8): 1377-1383.

Lim, E.S., S.Y. Baek, T. Oh, M. Koo, J.Y. Lee, H.J. Kim, and J.S. Kim. 2021. Strain variation in *Bacillus cereus* biofilms and their susceptibility to extracellular matrix-degrading enzymes. Plos One. 16(6): 1-15.

Liu, Z. and S.R. Smith. 2021. Enzyme recovery from biological wastewater treatment. Waste and Biomass Valorization. 12: 4185-4211.

Logan, N.A. and P.D. Vos. 2015. Bergey's Manual of Systematics of Archaea and Bacteria. Bergey's Manual Trust. 2015:1-164.

Logan, N.A. 2011. Bacillus and relatives in foodborne illness. Journal of Applied Microbiology. 112: 417-429.

Magani, A.K., T.E. Tallei, dan B.J. Kolondam. 2020. Uji antibakteri nanopartikel kitosan terhadap pertumbuhan bakteri *Staphylococcus aureus* dan *Escherichia coli*. Jurnal Bios Logos. 10(1): 7-12.



Majed, R., C. Faille, M. Kallassy, and M. Gohar. 2016. *Bacillus cereus* biofilms-same, only different. *Frontiers in Microbiology*. 7(1054): 1-16.

Mardliyati, E., S.E. Muttaqien, dan D.R. Setyawati. 2012. Sintesis nanopartikel kitosan-*tritypolyphosphate* dengan metode gelasi ionik: pengaruh konsentrasi dan rasio volume terhadap karakteristik partikel. Prosiding Pertemuan Ilmiah Ilmu Pengetahuan dan Teknologi Bahan.

Marques, S.C., J.G.O.S. Rezende, L.A.F. Alves, B.C. Silva, E. Alves, L.R. Abreu, and R.H. Piccoli. 2007. Formation of biofilms by *Staphylococcus aureus* on stainless steel and glass surfaces and its resistance to some selected chemical sanitizers. *Brazilian Journal of Microbiology*. 38: 538-543.

Mazancova, P., V. Nemethova, D. Trel'ova, L. Klescikova, I. Lacik, and F. Razga. 2018. Dissociation of chitosan/tripolyphosphate complexes into separate components upon pH elevation. *Carbohydrate Polymers*.

Monroe, D. 2007. Looking for chinks in the armor of bacterial biofilms. *PloS Biology*. 5(11): 2458-2461.

Mueller, R.F., W.G. Characklis, W.L. Jones, and J.T. Sears. 1991. Characterization of initial events in bacterial surface colonization by two *Pseudomonas* species using image analysis. *Biotechnology and Bioengineering*. 39: 1161-1170.

Nakanishi, E.Y., J.H. Palacios, S. Godbout, and S. Fournel. 2021. Interaction between biofilm formation, surface material and cleanability considering different materials used in pig facilities—an overview. *Sustainability*. 13(5836): 1-17.

Nambabi, M., A. Shoolongela, and M.B. Schneider. 2012. Control of bacterial contamination during marine fish processing. *Journal of Biology and Life Science*. 3(1): 1-17.

No, H.K. and S.P. Meyers. 1995. Preparation and characterization of chitin and chitosan – a review. *Journal of Aquatic Food Product Technology*. 4(2): 27-52.

Nugraheni, P.S., A.H. Soeriyadi, Ustadi, W.B. Sediawan, and W. Budhijanto. 2019. Comparison of formulation methods to produce nano-chitosan as inhibitor agent for bacterial growth. *Journal of Engineering and Technological Sciences*. 51(3): 430-441.

Nugraheni, P.S. 2019. Formulasi dan Aplikasi Nanokitosan Sebagai Senyawa Antibakteri Alami Untuk Peningkatan Masa Simpan (*Shelf-Life*) Ikan Segar. Disertasi.



Nurainy, F., S. Rizal, dan Yudiantoro. 2008. Pengaruh konsentrasi kitosan terhadap aktivitas antibakteri dengan metode difusi agar (sumur). *Jurnal Teknologi Industri dan Hasil Pertanian*. 13(2): 117-125.

Pan, M., L. Zhu, L. Chen, Y. Qiu, and J. Wang. 2016. Detection techniques for extracellular polymeric substances in biofilms: a review. *BioResources*. 11(3): 8092-8115.

Park, J., J. An, W. H. Lim, B. Lim, and S. Ahn. 2019. Microbial changes in biofilm on composite resins with different surface roughness: an in vitro study with a multispecies biofilm model. *J Prosthet Dent* 122: 492.e1-e8.

Prashanth, K.V.H. and R.N. Tharanathan. 2006. Crosslinked chitosan—preparation and characterization. *Carbohydrate Research*. 341: 169-173.

Qi, L., Z. Xu, X. Jiang, C. Hu, and X. Zou. 2004. Preparation and antibacterial activity of chitosan nanoparticles. *Carbohydrate Research*. 339(2004): 2693-2700.

Quiryen, M. and C. M. Bollen. 1995. The influence of surface roughness and surface-free energy on supra- and subgingival plaque formation in man. *J Clin Periodontol* 22: 1-14.

Rajkowski, K.T. 2009. Biofilms in fish processing. *Biofilms in the Food and Beverage Industries*.

Ramezani, Z., M. Zarei, and N. Raminnejad. 2015. Comparing the effectiveness of chitosan and nanochitosan coatings on the quality of refrigerated silver carp fillets. *Food Control*. 51: 43-48.

Rutala, W.A. and D.J. Weber. 2008. Guideline for Disinfection and Sterilization in Healthcare Facilities. Centers for Disease Control and Prevention.

Saharan, V., A. Menhrotra, R. Khatik, P. Rawal, S.S. Sharma, and A. Pal. 2013. Synthesis of chitosan based nanoparticles and their in vitro evaluation against phytopathogenic fungi. *International Journal of Biological Micromolecules*. 62: 677-683.

Sailer, M.F., E.J. Van Nieuwenhuijzen, and W. Knol. Forming of a functional biofilm on wood surfaces. *Ecological Engineering*. 36: 163-167.

Salopek, B., D. Krasic, and S. Filipovic. 1992. Measurement and application of zeta-potential. *Rudarsko-geolosko-naftni zbornik*. 4: 147-151.



Sano, H., K.I. Shibasaki, T. Matsukubo, and Y. Takaesu. 2003. Effect of chitosan rinsing on reduction of dental plaque formation. Tokyo Dental College. 44(1): 9-16.

Schmidt, R.H. 1997. Basic elements of equipment cleaning and sanitizing in food processing and handling operations. University of Florida.

Sharma, M. and S.K. Anand. 2002. Biofilms evaluation as an essential component of HACCP for food/dairy processing industry – a case. Food Control. 13:469-477.

Shi, S.F., J.F. Jia, X.K. Guo, Y.P. Zhao, D.S. Chen, Y.Y. Guo, and X.L. Zhang. 2016. Reduced *Staphylococcus aureus* biofilm formation in the presence of chitosan-coated iron oxide nanoparticles. International Journal of Nanomedicine. 11: 6499-6506.

Simoes, M., L.C. Simoes, and M.J. Vieira. 2010. A review of current and emergent biofilm control strategies. LWT – Food Science and Technology. 43(2010): 573-583.

Srey, S., I.K. Jahid, and S.D. Ha. 2013. Biofilm formation in food industries: a food safety concern. Food Control. 31: 572-585.

String, G., M. Domini, P. Mirindi, H. Brodsky, Y. Kamal, T. Tatro, M. Johnston, H. Badr, and D. Lantagne. 2020. Efficacy of locally-available cleaning methods in removing biofilms from taps and surfaces of household water storage containers. Npj Clean Water. 3(13): 1-11.

Sudheesh, P.S., A. Al-Ghabshi, N. Al-Aboudi, S. Al-Gharabi, and H. Al-Khadhuri. 2013. Evaluation of food contact surface contamination and the presence of pathogenic bacteria in seafood retail outlets in the sultanate of Oman. Advance Journal of Food Science and Technology. 5(2): 77-83.

Suherman, B., M. Latif, dan S.T.R. Dewi. 2018. Potensi kitosan kulit udang vannemei (*Litopenaeus vannamei*) sebagai antibakteri terhadap *Staphylococcus epidermidis*, *Pseudomonas aeruginosa*, *Propionibacterium agnes*, dan *Escherichia coli* dengan metode difusi cakram kertas. Media Farmasi. 14(1): 116-127.

Timmerman, C.P., A. Fleer, J.M. Besnier, L.D. Graaf, F. Cremers, and J. Verhoef. 1991. Characterization of a proteinaceous adhesin of *Staphylococcus epidermidis* which mediates attachment to polystyrene. Infection and Immunity. 59(11): 4187-4192.



- Tsai, R.Y., T.Y. Kuo, S.C. Hung, C.M. Lin, T.Y. Hsien, D.M. Wang, and H.J. 2015. Hsieh. Use of gum arabic to improve the fabrication of chitosan–gelatin-based nanofibers for tissue engineering. *Carbohydrate Polymers*. 115: 525-532.
- Vasut, R.G. and M.D. Robeci. 2009. Food contamination with psychrophilic bacteria. *Lucrări Stiințifice Medicină Veterinară*. 12(2): 325-330.
- Voss, A., R. W. Stark, and C. Dietz. 2014. Surface versus volume properties on the nanoscale: elastomeric polypropylene. *Macromolecules* 47(15): 5236-5245.
- Wang, Y., S. M. Lee and G. Dykes. 2014. The physicochemical process of bacterial attachment to abiotic surfaces: challenges for mechanistic studies, predictability and the development of control strategies. *Crit. Rev. Microbiol.* 41(4): 452-464.
- Winayu, I.J., N. Ekantari, I.D. Puspita, Ustadi, W. Budhijanto, and P.S. Nugraheni. 2019. The effect of reduced acetic acid concentration on nanochitosan formulation as fish preservative. *IOP Conference Series: Materials Science and Engineering*. 633: 1-6.
- Wu, S., S. Altenried, A. Zogg, F. Zuber, K. Maniura-Weber, and Q. Ren. 2018. Role of the surface nanoscale roughness of stainless steel on bacterial adhesion and microcolony formation. *ACS Omega* 3: 6456-6464.
- Yaneva, Z., D. Ivanova, N. Nikolova, M. Tzanova. 2020. The 21st century revival of chitosan in service to bio-organic chemistry. *Biotechnology & Biotechnological Equipment*. 34(1): 221-237.
- Yasir, M., M.D.P. Willcox, and D. Dutta. 2018. Action of antimicrobial peptides against bacterial biofilms. *Materials*. 11(2468): 1-15.
- Yusman, D.A. 2006. Hubungan Antara Aktivitas Antibakteri Kitosan Dan Ciri Permukaan Dinding Sel Bakteri. *Fakultas Matematika Dan Ilmu Pengetahuan Alam. Institut Pertanian Bogor. Skripsi*.
- Zhang, W. and W. Xia. 2014. Dissolution and stability of chitosan in a sodium hydroxide/urea aqueous solution. *Journal of Applied Polymer Science*. 39819: 1-6.
- Zhao, X., F. Zhao, J. Wang, and N. Zhong. 2017. Biofilm formation and control strategies of foodborne pathogens: food safety perspectives. *RSC Adv.* 7 : 36670 – 36683.