

DAFTAR PUSTAKA

- Abd-Aziz, S., C.C. Fernandez, M.M. Salleh, R.M. Illias, and M.A. Hassan. 2008. Effect of agitation and aeration rates on chitinase production using *Trichoderma virens* UKM1 in 2-1 stirred tank reactor. *Journal Applied Biochemistry and Biotechnology*. 150: 193-204.
- Awaludin, A. A. 2018. Aktivitas Kitinase *Serratia marcescens* PT-6 pada Berbagai Rasio Konsentrasi Pati dan *Yeast Extract*. Universitas Gadjah Mada. Skripsi.
- Badan Standarisasi Nasional (BSN). 2006. Cara uji mikrobiologi bagian 3: Penentuan angka lempeng total (ALT) pada produk perikanan. SNI 01-2332.3-2006. Jakarta.
- Baez dan Shiloach. 2014. Effect of elevated oxygen concentration on bacteria, yeasts, and cells propagated for production of biological compounds. *Microbial Cell Factories*. 13 (1): 1 – 7.
- Bandaiphet C., P. Prasertsan. 2006. Effect of aeration and agitation rates and scale-up on oxygen transfer coefficient, k_La in exopolysaccharide production from *Enterobacter cloacae* WD7. Elsevier: *Carbohydrate polymers*. 66: 216 – 228.
- Boediono, S. dan N. Nurita 2017. Siaran Pers Kemristekdikti Nomor 37/SP/HM/BKKP/IV/2017. Biro Kerjasama dan Komunikasi Publik Kemristekdikti, Jakarta. <https://ristekdikti.go.id/menristekdikti-resmikan-fasilitas-unit-produksi-enzim-bppt-pt-petrosida-gresik/>. Diakses pada 20 Mei 2019.
- Bruberg, M. B., F. N. Ingolf, V. G. H Eijsink. 1996. Comparative studies of chitinases A and B from *Serratia marcescens*. *Microbiology*. 142: 1581 – 1589.
- Catapano, G., P. Czermak, R. Eibl, E. Eibl, R. Portner. 2009. *Cell and Tissue Reaction Engineering*. Springer-Verlag Berlin Heidelberg.
- Cha, J. M., K. Cheong, C. Wol-Suk, C. DuBok, R. Sung-Hee, K. Sun-II. 2004. Optimal conditions for chitinase production by *Serratia marcescens*. *Journal of Biotechnology and Bioprocess Engineering*. 9: 297 – 302.
- Chen, J. K., C. R. Shen, C. L. Liu. 2010. N-acetylglucosamine: Production and Application. *Journal of Marine Drugs*. 8: 2493 – 2516.
- Chisti, Y., R. Robinson, C. Batt, and P. Patel. 1999. *Fermentation (Industrial): Basic Considerations in Encyclopedia of Food Microbiology*. Academic Press. London.
- Cleto S, Matos S, Kluskens L, Vieira MJ. 2012. Characterization of contaminants from a sanitized milk processing plant. *PLoS ONE*. 7 (6): 1 – 8.
- Cohen-Kupiec R., dan L. Chet. 1998. The Molecular Biology of Chitin Digestion. *Curr. Opinion Biotechnology*. 9: 270 – 277

- Dalahi, F., S. Subekti, dan Agustono. 2014. Isolasi dan Identifikasi Bakteri yang terdapat pada Saluran Pencernaan Ikan Gurami (*Osphronemus gouramy*) dengan Pemberian Pakan Komersil yang Berbeda. *Jurnal Ilmiah Perikanan dan Kelautan*. 6 (1): 87 – 92.
- Donderski, W. dan M. Trzebiatowska. 1999. Chitinase Activity Production by Planktonic, Benthic and Epiphytic Bacteria Inhabiting The Moty Bay of the Jeziorak Lake (Poland). *Polish Journal of Environmental Studies*. 8(4): 215 – 220.
- Ducros E., M. Ferrari, M. Pellegrino, C. Raspanti, and C. Bogni. 2009. Effect of aeration and agitation on the protease production by *Staphylococcus aureus* mutant RC128 in a stirred tank bioreactor. *Bioprocess Biosys Eng*. 32: 143 - 148
- Dutta, P.K., J. Dutta, and V.S. Tripathi. 2004. Chitin and chitosan: chemistry, properties and applications. *Journal of Scientific and Industrial Research*. 63: 20-31.
- Einbu A. and K. M. Varum. 2008. Characterization of chitin and its hydrolysis to GlcNAc and GlcN. *Journal of biomacromolecules*. 9 (7): 1870 – 1875.
- Elkenawy, N.M., A.S. Yassin, H.N. Elhifnawy, dan M.A. Amin. Optimization of Prodigiosin Production by *Serratia marcescens* Using Crude Glycerol and Enhancing Production Using Gamma Radiation. *Biotechnology Reports*. 14: 47–53.
- Etoc, A., F. Delvigne, J. P. Lecomte, P. Thonart. 2006. Foam control in Fermentation Bioprocess. *Applied Biochemistry and Biotechnology*. 6: 392 – 404.
- Faidah H. S., S. S. Ashgar, A. A. Barhameen, H. M. El-Said, A. Elsayy. 2015. *Serratia marcescens* as opportunistic pathogen and the importance of continuous monitoring of nosocomial infection in Makah City, Saudi Arabia. *Journal of Medical Microbiology*. 5: 107 – 112.
- Fenice, M., P. Barghini, L. Selbmann, and F. Federici. 2012. Combined effect of agitation and aeration of the chitinolytic enzymes production by the antarctic fungus *Lecanicilium muscarium* CCFEE 5003. *Microbial Cell Factories*. 11 (12): 1 – 10.
- Fleuri, L. F., H. Y. Kawaguti, H. H. Sato. 2009. Production, purification, and application of extracellular chitinase from *Cellulosimicrobium cellulans* 191. *Brazilian Journal of Microbiology*. 40: 623 – 630.
- Gayathri N., R. Subashkumar. 2017. Phenotypic and genotypic characterization of *Serratia marcescens* from clinical and environmental sources. *International Journal of Pharmacognosy and Phytochemical Research*. 9 (11): 1392 – 1397.
- Ghoshal, G., U. C. Banerjee, U. S. Shivhare. 2014. Xylanase Production by *Penicillium citrinum* in Laboratory-Scale Stirred Tank Bioreactor. *Chemical and Biochemical Engineering Journal*. 28 (3): 399 – 408.

- Gooday, G.W. 1994. Physiology of Microbial Degradation of Chitin and Chitosan. Biochemistry of Microbial Degradation. Kluwer Academic Publication, Netherlands.
- Green, A. T., M. G. Healy, A. Healy. 2005. Production of chitinolytic enzyme by *Serratia marcescens* QMB1466 using various chitinous substrates. Journal of Chemical Technology and Biotechnology. 80: 28 – 34.
- Haliza, W., dan M.T. Suhartono. 2012. Karakteristik kitinase dari mikrobia. Buletin Teknologi Pasca Panen Pertanian. 8 (1): 1 – 14.
- Hamid, R., M.A. Khan, M. Ahmad, M. M. Ahmad, M. Z. Abdin, J. Musarrat, S. Javed. 2015. Chitinase: an update. Journal of Pharmacy and BioAllied Sciences. 5 (1): 21 – 29.
- Hargono, Abdullah, dan I. Sumantri. 2008. Pembuatan kitosan dari limbah cangkang udang serta aplikasinya dalam mereduksi kolesterol lemak kambing. Reaktor. 12 (1): 53-57.
- Harman, G.E., C.K. Hayes, M. Lorito, R.M. Broadway, A. Di-Pietro, C. Peterbauer, dan A. Tronsmo. 1993. Chitinolytic Enzymes of *Trichoderma harzianum*: Purification of Chitobiosidase and Endochitinase. Philopathology Journal. 83: 313 – 318.
- Hejazi, A., F. R. Falkiner. 1997. Review article: *Serratia marcescens*. Journal Medical Microbiological. 46: 903 – 912.
- Herdyastuti, N., J.R. Tri, Mudasir, and M. Sabirin. 2009. Chitinase dan chitinolytic microorganism: isolation, characterization and potential. Jurnal Kimia. 9 (1): 37-47.
- Holt, J. G., N. R. Krieg, Sneath, H. A. Peter, J. T Staley, and S. T. Williams. 1994. Bergeys Manual of Determinative Bacteriology Ninth Edition. The Williams and Wilkins Company. United States.
- Horn, S. J., M. Sorlie, G. Vaaje-Kolstad, A. L. Norberg, B. Synstad, K. M. Varum, V. G. H. Eijsinkl. 2006. Comparative Studies of Chitinase A, B, and C from *Serratia marcescens*. Biocatalyst and Biotransformation. 24 (1/2): 39 – 53.
- Hsu, S. and C. Lockwood. 1974. Powdered chitin agar as a selective medium for enumeration of Actinomycetes in water and soil. Journal of Applied Microbiology. 29 (3): 422-426.
- Isa, M. T., A. O. Ameh, M. Tijjani, and K. K. Adama. 2012. Extraction and characterization of chitin and chitosan from Nigerian shrimps. International Journal of Biological and Chemical Sciences. 6 (1): 446 - 453
- Kandra, P., Challa, M.M., and K. P. Jyothi, H. 2012. Efficient use of shrimp waste: present and future trends. Appl Microbiol Biotechnol. 93: 17-29.

- Khikmah, N., S. Margiono, R. S. Kasiamdari. 2016. Isolasi, Seleksi, dan Identifikasi Kapang Kitinolitik yang Diisolasi dari Tanah Pembuangan Limbah Udang dan Rizosfer Solanaceae. *Jurnal Biota*. 1 (1): 1-8.
- Knaul, J. Z., Hudson, S. M., Creber K. A. M. 1999. Improved mechanical properties of chitosan fibers. *Journal of Applied Polymer Science*. 72 (13): 1721 – 1732.
- Komi D. E. and M. R. Hamblin. 2016. Chitin and Chitosan: Production and Application of Versatile Biomedical Nanomaterials. *International Journal of Advanced Research*. 4 (3): 411 – 427.
- Mahlen, D. S. 2011. *Serratia* infections: from military experiments to current practice. *Clinical Microbiology Reviews*. 24 (4): 755 – 791.
- Malik, A. 2000. Konstruksi Fusi Transkripsi Gen Kitinase dari *Aeromonas caviae* dan Ekspresinya pada *Pseudomonas fluorescens*. Program Pascasarjana. Institut Pertanian Bogor. Disertasi Doktor.
- Mantzouridou, F.; Roukas, T.; Kotzekidou, P. 2002. Effect of the aeration rate and agitation speed on β -carotene production and morphology of *Blakeslea trispora* in a stirred tank reactor: Mathematical modeling. *Biochemical Engineering Journal*. 10: 123 –135.
- Mojtabaei, M. and M. Jalili. 2014. Laboratory safety organization. *Journal of Biosafety*. 3 (1): 148
- Moretro T., S. Langsrud. 2017. Residential bacteria on surfaces in the food industry and their implications for food safety and quality. *Comprehensive reviews in food science and food safety*. 16: 1022 – 1041.
- Oliveira F., J. M. Salgado, N. Perez-Rodriguez, J.M. Dominguez, A. Venancio, I. Belo. 2018. Lipase production by solid-state fermentation of olive pomace in tray-type and pressurized bioreactors. *Journal of Chemical Technology and Biotechnology*. 93 (5): 1312 -1319.
- Parani, K., G. P. Shetty, B. K. Saha. 2011. Isolation of *Serratia marcescens* SR1 as a Source of Chitinase Having Potentiality of Using as Biocontrol Agent. *Indian Journal Microbiology*. 51 (3): 247 – 250
- Pelczar, M.J. and E.C.S Chan. 2008. *Dasar-Dasar Mikrobiologi*. Universitas Indonesia Press, Jakarta
- Petersen, L. M., and L. S. Tisa. 2013. Friend or foe? A review of the mechanisms that drive *Serratia* towards diverse lifestyles. *Canadian Journal of Microbiology*. 59 (9): 627 – 640.
- Patil, R.S., V. Ghormade, & M.V. Deshpande. 2000. Chitinolytic Enzymes: An Exploration. *Enzyme and Microbial Technology*. 26 (7):473-483

- Pino M. S., R. M. Rodriguez-J asso, M. Michelin, A. C. Flores-Gallegos, R. Morales-Rodriguez, J. A. Teixeira, H. A. Ruiz. 2018. Bioreactor Design for Enzymatic Hydrolysis of Biomass Under the Biorefinery Concept. *Chemical Engineering Journal*.
- Pratiwi, R. S., T. E. Susanto, Y. A. K. Wardani, A. Sutrisno. 2015. Enzim Kitinase dan Aplikasi di Bidang Industri: Kajian Pustaka. *Jurnal Pangan dan Agroindustri*. 3 (3): 878 – 887
- Rachman. 1989. Pengantar Teknologi Fermentasi. IPB, Bogor.
- Reissig, J.L., J.L. Strominger, and L.F. Leloir. 1955. A modified colorimetric method for the estimation of N-Acetylamino sugars. *The Journal of Biological Chemistry*. 217: 959-966.
- Salmin. 2005. Oksigen Terlarut (DO) dan Kebutuhan Oksigen Biologi (BOD) sebagai Salah Satu Indikator untuk Menentukan Kualitas Perairan. *Oseana*. XXX (3): 21 – 26.
- Satiawihardja, B. 1983. Mengenal Fermentor. *Buletin Pusbangtepa FTDC-IPC*. 5 (16): 62-70.
- Setiawan, Hendri. 2017. Optimasi pH dan Suhu untuk Memproduksi N-Asetilglukosamin dengan Kitinase Kasar *Serratia marcescens* PT-6. Universitas Gadjah Mada. Skripsi.
- Soeka, Y. S., dan E. Triana. 2016. Pemanfaatan limbah kulit udang untuk menghasilkan enzim kitinase dari *Streptomyces macrosporeus* InaCC A454. *Jurnal Kimia Terapan Indonesia*. 18 (1): 91 – 101.
- Sumayani, R. Kusdarwati, Y. Cahyoko. 2008. Daya antibakteri perasan rimpang lengkuas dengan konsentrasi berbeda terhadap pertumbuhan *Aeromonas hydrophila* secara in vitro. *Jurnal berkala ilmiah perikanan*. 3 (1): 83 – 87.
- Svitil, A.L., M.N. Sinead, A.M. Jessica, and L.K. David. 1997. Chitin degradation protein produced by the marine bacterium *Vibrio harveyi* growing on different forms of chitin. *Journal of Applied and Environmental Microbiology*. 63 (2): 408-413.
- Swastawati F., I. Wijayanti, E. Susanto. 2008. Pemanfaatan limbah kulit udang menjadi *edible coating* untuk mengurangi pencemaran lingkungan. *Universitas Diponegoro*. 4 (4): 101 – 106.
- Tamimi, M., dan N. Herdyastuti. 2013. Analisis gugus fungsi dengan menggunakan spektroskopi FT-IR dari variasi kitin sebagai substrat kitinase bakteri *Pseudomonas sp.* TNH-54. *UNESA Journal of chemistry*. 2 (2): 47 – 51.
- Uddin, S. N., A. M. Hasan, M. R. Anoer, M. A. Salam, M. J. Alam, S. Islam. 2005. Commercial Enzymes Production by Recombinant DNA Technology: A Conceptual Works. *Pakistan Journal of Biological Sciences*. 8 (2): 345 – 355.

- Vittaladevaram, Viswanath. 2017. Fermentative Production of Microbial Enzymes and their Applications: Present Status and Future Prospects. *Journal of Applied Biology and Biotechnology*. 5 (4): 90 – 94.
- Wang, S.L., T.W. Liang, and Y.H. Yen. 2011. Bioconversion of chitin-containing wastes for the production of enzymes and bioactive material. *The Journal of Microbiology*. 84: 732 - 742.
- Wicaksono, S., E. Kusdiyantini, B. Raharjo. 2017. Pertumbuhan dan produksi pigmen merah oleh *Serratia marcescens* pada berbagai sumber karbon. *Jurnal Biologi*. 6 (3): 66 – 75.
- Widhyastuti, N. 2010. Purifikasi N-asetil-D-glukosamina Hasil Sintesa Secara Enzimatis Untuk Bahan Obat dan Pangan Fungsional. Pusat Penelitian Biologi, Lembaga Ilmu Pengetahuan Indonesia. Bogor.
- Wriahusna, A. F. 2018. Aktivitas Kitinase *Serratia marcescens* PT-6 pada Berbagai Kecepatan Agitasi dalam Fermentor. Universitas Gadjah Mada. Skripsi.
- Wulansari, B., N. B. Isnaini, I. D. Puspita, A. Husni, Ustadi. 2017. Bioinformation of N-Acetylglucosamine from Shrimp Shell Chitin by *Serratia marcescens* PT-6 Cultured in Various pH and Temperature. *Jurnal Perikanan Universitas Gadjah Mada*. 19 (1): 53 – 59.
- Younes, I and Marguerite, R. 2015. Chitin and chitosan preparation from marine sources, structure, properties and applications. *Marine Drugs Journal*. 13: 1133 - 1174.
- Yuh-Lih H, Wen-Teng Wu. 2002. A novel approach for scaling-up a fermentation system. *Biochem Eng J*. 11: 123 - 130.
- Yurnaliza. 2002. Senyawa kitin dan kajian aktivitas enzim mikrobial pendegradasinya. Fakultas Matematika dan Ilmu Pengetahuan Alam. Universitas Sumatera Utara.
- Zhou Y., H. Li-Rong, H. Hong-Wei, Bu-Sang, Y. Dai-Lin, F. Jun-Tao, Z. Xing. 2018. Effects of Agitation, Aeration and Temperature on Production of a Novel Glycoprotein GP-1 by *Streptomyces kanasensis* ZX01 and Scale-Up Based on Volumetric Oxygen Transfer Coefficient. *Molecules Journal*. 23 (125): 1 – 14.
- Zhou Y., S. Yu-Bon, H. Hong-Wei, F. Jun-Tao, H. Li-Rong. 2017. Optimization of medium compositions to improve a novel glycoprotein production by *Streptomyces kanasensis* ZX01. *AMBExpress*. 7 (6): 1 – 9.