

DAFTAR PUSTAKA

- Agustina, S., Swantara, I. M. D., dan Suartha, I. N. 2015. Isolasi kitin, karakterisasi, dan sintesis kitosan dari kulit udang. *Jurnal Kimia* 9(2): 271-278.
- Anuradha, V., Revathi, K. 2013. Purification and characterization of bacterial chitinase isolated from crustacean shells. *International Journal of Pure & Applied Bioscience* 1(4): 1-11.
- Arif, A. R., Ischaidar, Natsir, H., dan Dali, S. 2013. Isolasi kitin dari limbah udang putih (*Penaeus merguensis*) secara enzimatis. Seminar Nasional Kimia: Peran Sains dan Teknologi Dalam mendukung Ketahanan Pangan dan Energi Nasional, Universitas Hasanuddin, Makassar.
- Association of Official Analytical Chemist (AOAC). 2005. *Official Methods of Analysis of AOAC International*. AOAC International, Madison.
- Badan Standarisasi Nasional [BSN]. 2013. SNI 7948:2013. *Kitin: Syarat Mutu dan Pengolahan*. Badan Standarisasi Nasional, Jakarta.
- Bisen, P. S. 2014. *Laboratory protocols in applied life sciences*. CRC Press: Boca Raton.
- Bottone, Edward J. 2010. *Providencia stuartii*, a volatile human pathogen. *Clinical Microbiology Reviews* 23(2): 382-398.
- Brooks, G.F., Carroll, K.C., Butel, J.S., Morse, S.A. and Mietzner T.A. 2012. *Jawetz, Melnick, & Adelberg's Medical Microbiology, Twenty-Fifth Edition*. McGraw Hill Professional, Pennsylvania.
- Buller, N. B. 2014. *Bacteria and fungi from fish and other aquatic animals: a practical identification manual*. 2nd ed. CABI, Oxfordshire.
- Centre of Agriculture and Biosciences International (CABI). 2018. *Penaeus monodon* (Giant Tiger Prawn). *Invasive Species Compendium*. Available from <https://www.cabi.org/isc/datasheet/71093>. Accessed 2018 July 14.
- Cheba, B. A., Zaghoul, T. I., El-Mahdy, A. R., dan El-Massry, M. H. 2015. Effect of pH and temperatur eon *Bacillus* sp. R2 chitinase activity and stability. *Procedia Technology* 22: 471-477.
- Chen, J. K., Shen, C. R., dan Liu, C. L. 2010. N-acetylglucosamine: production and applications. *Marine Drugs* 8: 2493-2516.

- Clifford, R. J., Hang, J., Riley, M. C., Onmus-Leone, F., Kuschner, R. A., Lesho, E. P., dan Waterman, P. E. 2012. Complete genome sequence of *Providencia stuartii* clinical isolate MRSN 2154. *Journal of Bacteriology* 194(14): 3736-3737.
- Czechowska-Biskup, R., Jarosinska, D., Rokita, B., Ulanski, P., dan Rosiak, J. M. 2012. Determination of degree of deacetylation of chitosan-comparison of methods. *Progress on Chemistry and Application of Chitin and Its Derivatives* 17(1): 5-20.
- DeLong, D. 2006. *How to Dry Foods*. Home, New York, hlm. 6.
- Direktorat Jenderal Perikanan Budidaya (DJPB). 2016. Udang vaname dan udang windu masih andalan ekspor indonesia. Pakan. Available from http://www.djpb.kkp.go.id/arsip/c/246/Udang-Vanamei-dan-Udang-Windu-Masih-AndalanEkspor-Indonesia/?category_id=13. Accessed 2018 July 14.
- Dompeipen, E. J., Kaimudin, M., dan Dewa, R. P. Isolasi kitin dan kitosan dari limbah kulit udang. *Majalah Biam: Kementerian Perindustrian Republik Indonesia*, 2016.
- Dong, Y. M., Xu, C. Y., Wang, J. W., Wang, M., Wu, Y. S. dan Ruan, Y. H. 2001. Determination of degree of substitution for n-acetylated chitosan using ir spectra. *Journal of Science in China Series B: Chemistry* 44(2): 216-224.
- Doyle, M. P., dan Buchanan, R. L. 2012. *Food Microbiology: fundamentals and frontiers*. American Society for Microbiology Press: Washington DC.
- Dubey, R. C. dan Maheswari, D. K. 2012. *Practical Microbiology*. S.Chand and Company Pvt. Ltd, New Delhi, hlm. 420-421.
- Dwevedi, A. 2016. *Enzyme immobilization advances in industry, agriculture, medicine, and the environment*. Springer, Switzerland, hlm. 23-25.
- Ehiowemwenguan G., Emoghene A. O., dan Inetianbor J. E. 2014. Antibacterial and phytochemical analysis of banana fruit peel. *IOSR Journal of Pharmacy* 4(8): 18-25.
- Elnashar, M. M., Awad, G. E., Hassan, M. E., Eldin, M. S. M., Haroun, B. M., dan El-Diwany, A. I. 2014. Optimal immobilization of β -galactosidase onto κ -carrageenan gel beads using response surface methodology and its applications. *The Scientific World Journal*: 1-7.
- Fitri, L., dan Yasmin, Y. 2011. Isolasi dan pengamatan morfologi koloni bakteri kitinolitik. *Jurnal Ilmiah Pendidikan Biologi, Biologi Edukasi* 3(2): 20-25.

- Food and Agriculture Organization of The United Nations (FAO). Black tiger shrimp - *Penaeus Monodon*. 2018. Fao.org. Available from <http://www.fao.org/fishery/affris/species-profiles/giant-tiger-prawn/giant-tiger-prawn-home/en/>. Accessed 2018 July 14.
- Haliza, W., dan Suhartono, M. T. 2012. Karakteristik kitinase dari mikrobial. Buletin Teknologi Pascapanen Pertanian 8:1.
- Hauselman, H. J. 2001 Nutripharmaceuticals for osteoarthritis. Best Practice & Research: Clinical Rheumatology 15: 595-607.
- Herdyastuti, N., Raharjo, T. J., Mudasir, dan Matsjeh, S. 2009. Chitinase and chitinolytic mikroorganism: isolation, characterization and potential. J. Chem. 9:1, 37-47.
- Hidayat, H. 2011. Karakterisasi molekuler bal dengan gen 16s rRNA penghasil enzim protease yang berpotensi sebagai probiotik dari fermentasi markisa kuning di Sumatera Barat. Skripsi, Universitas Andalas, Padang.
- Hossain, M. S. dan Iqbal, A. 2014. Production and characterization of chitosan from shrimp waste. Journal of the Bangladesh Agricultural University 12 (1): 153-160.
- Jain, T., Kumar, H., dan Dutta, P. K. 2015. *D-glucosamine and n-acetyl D-glucosamine: their potential use as regenerative medicine*. Springer, New Delhi.
- Josephine, C. 2018. Uji indeks kitinolitik bakteri yang diisolasi dari kulit udang windu (*Penaeus monodon*). Skripsi, Universitas Pelita Harapan, Tangerang.
- Karunya, S. K., Reetha, D., Saranraj, P., dan Milton, D. J. 2011. Optimization and purification of chitinase produced by *Bacillus subtilis* and its antifungal activity against plant pathogens. International Journal of Pharmaceutical & Biological Archives 2(6): 1680-1685.
- Kementrian Kelautan dan Perikanan (KKP). 2016. MEA Centre. Sektor Kelautan dan Perikanan. Accessed 2018 July 14.
- Kubota, T., Miyamoto, K., Yasuda, M., Inamori, Y., dan Tsujibo, H. 2004. Molecular characterization of an intracellular β -N-Acetylglucosaminidase involved in the chitin degradation system of *Streptomyces thermoviolaceus* OPC-520. Bioscience, Biotechnology, and Biochemistry 68(6): 1306-1314.
- Kurmasheva, N., Vorobiev, V., Sharipova, M., Efremova, T., dan Mardanova, A. 2018. The potential virulence factors of *Providencia stuartii*: motility, adherence, and invasion. BioMedical Research Journal, Hindawi.

- Kurniasih, K dan Dwiasi, W. 2007. Preparasi dan karakterisasi kitin dari kulit udang putih (*Litopenaeus vannamei*). Jurnal Molekul 2 (2) : 79-87.
- Lawati, N. 2013. Pemurnian parsial dan karakterisasi enzim kitinase dari *Beauveria bassiana*. Skripsi, Institut Pertanian Bogor, Bogor.
- Lee, B. H. 2015. *Fundamentals of Food Biotechnology*. John Wiley & Sons: Chichester.
- Lestari, P., Prihatiningsih, N., dan Djatmiko, H. A. 2017. Partial biochemical characterization of crude extract extracellular chitinase enzyme from *Bacillus subtilis* B298. IOP Conference Series: Materials Science and Engineering 172.
- Liang, T. W., Chen, Y.Y., Pan, P. S., dan Wang, S. L. 2014. Purification of chitinase/chitosanase from *Providencia stuartii* and discovery of an enzyme inhibitor. International Journal of Biological Macromolecules 63: 8-14.
- Mahyudin, A. R., Yuliandri, R., dan Syaawalz, A. 2011. Isolasi dan karakterisasi kitin dari limbah udang. Jurnal Sains Natural Universitas Nusa Bangsa 1(2): 166-178.
- Mohamed, H., Tamer, T., dan Ahmed, O. 2016. Methods of enzyme immobilization. International Journal of Current Pharmaceutical Review and Research 7(6): 385-392.
- Mojarrad, J. S., Nemari, M., Valizadeh, H., Ansarin, M., dan Bourbour, S. 2007. Preparation of glucosamine from exoskeleton of shrimp and predicting production yield by response surface methodology. Journal of Agricultural and Food Chemistry 55: 2246-2250.
- Nadia, L. M. H, Suptijah, P., dan Ibrahim, B. 2014. Produksi dan karakterisasi nano kitosan dari cangkang udang windu dengan metode gelasi ionik. Jurnal Pengolahan Hasil Perikanan Indonesia 17(2): 119-126.
- National Center for Biotechnology Information (NCBI). 2018. *Providencia stuartii*. NCBI Taxonomy Browser. Available from <https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?mode=Info&id=1157951&lvl=3&lin=f&keep=1&srchmode=1&unlock>. Accessed 2018 July 19.
- Nguyen, H. H., dan Kim, M. 2017. An overview of techniques in enzyme immobilization. Appl. Sci. Converg. Technol. 26(6): 157-163.
- Nielsen, S. S. 2010. *Food Analysis*. 4th ed. Springer Science Business Media, New York, hlm. 578-582.

- Öztürk, B. 2001. *Immobilization of Lipase from Candida rugosa on Hydrophobic and Hydrophilic Supports*. Biotechnology and Bioengineering. İzmir Institute of Technology: Turkey.
- Pavel, C. I., Mărghitaş, L. Al., Bonta, V., Mihai, C. M., dan Tomoş, L. I. 2013. Determination of total protein content in royal jelly: a comparison of the kjeldahl, the bradford and the lowry methods. *Lucrări Ştiinţifice-Seria Zootehnie* 59: 209-212.
- Poeloengasih, C. D., Hernawan, Suharto, S.K.W., dan Kismurtono, M. 2009. Optimization of chitin production from *Panaeus monodon* shells at ambient temperature. *Proceedings of National Seminar on Applied Technology, Science, and Arts (1st Aptecs)*: 861-864.
- Pratiwi, R. S., Susanto, T. E., Wardani, Y. A. K., dan Sutrisno, A. 2015. Enzim kitinase dan aplikasi di bidang industri: Kajian Pustaka. *Jurnal Pangan dan Agroindustri* 3(3): 878-887.
- Priest, F. G. dan Campbell, I. 2002. *Brewing Microbiology*. Springer Science and Business Media, New York, hlm 308.
- Puspawati, N. M. dan Simpen, I. N. 2010. Optimasi deasetilasi khitin dari kulit udang dan cangkang kepiting limbah restoran *seafood* menjadi khitosan melalui variasi konsentrasi NaOH. *Jurnal Kimia* 4(1): 79-90.
- Rahmansyah, M. dan Sudiana, I. M. 2003. Optimasi analisis amilase dan glukonase yang diekstrak dari miselium *Pleurotus ostreatus* dengan asam 3,5 dinitrosalisilat. *Berk. Penel. Hayati* 9: 7-12.
- Rathan, S., dan Thayumanavan, T. Immobilization of chitinase from *Pseudomonas putida* on biocompatible chitosan beads and the properties of the immobilized enzyme. *Journal of Global Biosciences* 6(5): 5032-5045.
- Ravichandran S, Rameshkumar G, Prince AR. 2009. Biochemical composition of shell and flesh of the indian white shrimp *Panaeus indicus* (H.milne Edwards 1837). *Journal of Scientific Research* 4(3):191-194.
- Rifai, D. N. R. 2007. Isolasi dan identifikasi kitin, kitosan dari cangkang hewan mimi (*Horseshoe Crab*) menggunakan spektrofotometri infra merah. *Alchemy* 2(1): 104-157.
- Sadhya, C., Adapa, L. K., Nampoothiri, M., Binod, P., Szakacs, G., dan Pandey A. 2004. Extracellular chitinase production by *Trichoderma harzianum* in submerged fermentation. *Journal of Basic Microbiology* 44(1): 49-58.
- Saguez, J., Vincent, C. and Giordanengo, P. 2008. Chitinase inhibitors and chitin mimetic for crop protection. *Pest technology*. 2:2, 81-86.

- Saha, D., dan Bhattacharya, S. 2010. Hydrocolloids as thickening and gelling agents in food: a critical review. *Journal of Food Science and Technology* 47(6): 587-597.
- Sankalia, M. G., Mashru, R. C., Sankalia, J. M., dan Sutariya, V. B. 2006. Stability improvement of alpha-amylase entrapped in kappa-carrageenan beads: physicochemical characterization and optimization using composite indeks. *Internasional Journal of Pharmaceutics* 312: 1-14.
- Sanusi, M. 2004. Transformasi kitin dari hasil isolasi limbah industri udang beku menjadi kitosan. *Mar. Chim Acta* 5(2): 28-32.
- Sashiwa, H., Fujishima, S., Yamano, N., Kawasaki, N., Nakayama, A., Muraki, E., Hiraga, K., Oda, K., dan Aiba, S. 2002. Production of N-acetyl-D-glucosamine from α -chitin by crude enzymes from *Aeromonas hydrophila* H-2330. *Carbohydrate Research* 337: 761-763.
- Saskiawan, I. dan Handayani, R. 2011. Production of N-acetyl-D-glucosamine by submerged fermentation from chitin. *Berita Biologi* 10(6): 20-28.
- Setijawati, D., Wijana, S., Aulaniam, dan Santosa, I. 2011. Viabilitas dan struktur mikrokapsul *Lactobacillus acidophilus* dengan bahan penyalut karaginan Semi Murni Jenis *Eucheuma cottonii*. *Jurnal Teknologi Pangan* 2(1): 50-67.
- Sharma, M., Sharma, V., Majumdar, D. K. 2014. Entrapment of α -Amylase in agar beads for biocatalysis of macromolecular substrate. *Hindawi: International Scholarly Research Notices*.
- Sidi, N. C., Widowati, E., dan Nursiwi, A. 2014. Pengaruh penambahan karagenan pada karakteristik fisikokimia dan sensoris fruit leather nanas (*Ananas comosus* L. Merr.) dan wortel (*Daucus carota*). *Jurnal Aplikasi Teknologi Pangan* 3(4): 122-127.
- Singh, B. D. 2009. *Biotechnology expanding horizons*. India: Kalyani.
- Sitanggang, Sophia, dan Wu. 2012. Minireview: aspect of glucosamine production using microorganism. *International Food Research Journal* 19(2): 393-404.
- Suharjo, dan Harini, N. 2005. Ekstraksi *chitosan* dari cangkang udang windu (*Penaeus monodon* sp.) Secara fisika-kimia (kajian berdasarkan ukuran partikel tepung *chitin* dan konsentrasi NaOH). *Jurnal GAMMA* 1(1): 7-15.
- Sun, D. 2014. *Emerging technologies for food processing*. Elsevier, Amsterdam.
- Teja, E. 2018. Optimasi produksi n-asetil-glucosamin dari kulit udang windu menggunakan enzim kitinase intraseluler semi murni *Providencia stuartii*. Skripsi, Universitas Pelita Harapan, Tangerang.

- Verena, S. 2008. Chitinases of filamentous fungi: a large group of diverse proteins with multiple physiological functions. *Fungal Biology Reviews*. 22:1, 36-42.
- Won, K., Kim, S., Kim, K. J., Park, H. W. and Moon, S.J. 2005. Optimization of lipase entrapment in ca-alginate gel beads. *Process Biochemistry*, 40(6): 2149-2154.
- Worth, D., Nance, P., dan Wilson, E. H. 2013. Chitinase assay from cultured bone marrow derived macrophages. *Bio Protocol* 3(23): 1-5.
- Xia, J. L., Xiong, J., Zhang, R. Y., Liu, K. K., Huang, B., dan Nie, Z. Y. 2011. Production of chitinase and its optimization from a novel isolate *Serratia marcescens* xj-01. *Indian Journal of Microbiology* 51(3): 301-306.
- Yada, R. Y. 2015. *Improving and Tailoring Enzymes for Food Quality and Functionality, 1st Edition*. Woodhead Publishing, Vancouver, hlm. 11-53.
- Younes, I., dan Rinaudo, M. 2015. Chitin and chitosan preparation from marine sources. Structure, properties and applications. *Marine Drugs* 13: 1133-1174.
- Zusfahair, Ningsih, D. R., Fatoni, Kartika, D., Fatoni, A., dan Zuliana, A. L. 2017. *Bacillus thuringiensis* HCB6 amylase immobilization by chitosan beads. *IOP Conf. Series: Materials Science and Engineering* 172: 1-9.
- Zvezdova, D. 2010. Synthesis and characterization of chitosan from marine sources in black sea. *Scientific Works of the Rousse University by Bulgaria* 49: 65-69.