

DAFTAR PUSTAKA

- Abang, M., Winter, S., Green, K., Hoffmann, P., Mignouna, H., & Wolf, G. 2002. "Molecular Identification of *Colletotrichum gloeosporioides* Causing Yam Anthracnose in Nigeria". *Plant Pathology*, 51(1), 63-71.
- Abd-Elsalam, K. A. 2003. "Bioinformatic Tools and Guideline for PCR Primer Design". *African Journal of Biotechnology*, 2(5), 91-95.
- Adams, D. J. 2004. "Fungal Cell Wall Chitinases and Glucanases". *Microbiology*, 150(7), 2029-2035.
- Ademe, A., Ayalew, A., & Woldetsadik, K. 2014, "In Vitro and In Vivo Activity of Selected Plant Extracts Against Papaya *Carica papaya* L.) Anthracnose (*Colletotrichum gloeosporioides*)". *Journal of Horticulture*, 1-4.
- Agrios, G. N. (2005). *Plant Pathology*. 5th eds. Elsevier Academic Press. USA, 8, 1-40.
- Ahanger, R., Bhatand, H., & Dar, N. 2014. "Biocontrol Agents and Their Mechanism in Plant Disease Management". *Sciencia Acta Xaver*, 5, 47-58.
- Alberts, B., Bray, D., Lewis, J., Raff, M., Roberts, K., & Watson, J. (1994). *Molecular Biology of the Cell*. 1994, New York & London: Garland Publishing, Inc.
- Anitha, A., & Rabeeth, M. 2010. "Degradation of Fungal Cell Walls of Phytopathogenic Fungi by Lytic Enzyme of *Streptomyces griseus*". *African Journal of Plant Science*, 4(3), 61-66.
- Baban, J., Fjeld, S., Sakuda, S., Eijsink, V. G., & Sørlie, M. 2010. "The Roles of Three *Serratia marcescens* Chitinases in Chitin Conversion are Reflected in Different Thermodynamic Signatures of Allosamidin Binding". *The Journal of Physical Chemistry B*, 114(18), 6144-6149.
- Babashpour, S., Aminzadeh, S., Farrokhi, N., Karkhane, A., & Haghbeen, K. 2012. "Characterization of a Chitinase (Chit62) from *Serratia marcescens* B4A and Its Efficacy as a Bioshield Against Plant Fungal Pathogens". *Biochemical Genetics*, 50(9-10), 722-735.
- Bailey, J., O'Connell, R., Pring, R., & Nash, C. 1992. "Infection Strategies of *Colletotrichum* Species. In: *Colletotrichum: Biology, Pathology and Control* (eds. J. A. Bayley and M. J. Jeger)". Centre Agriculture and Biosciences International: Wallingford: 88-120.
- Bailey, K. L., Boyetchko, S. M., and Lange, T. 2010. "Social and Economic Drivers Shaping The Future of Biological Control: A Canadian Perspective on The Factors Affecting The Development and Use of Microbial Biopesticides". *Biological Control*, 52: 221-229.

- Baxevanis, A. D., & Ouellette, B. F. 2004. *Bioinformatics: A Practical Guide to The Analysis of Genes and Proteins* (Vol. 43): John Wiley & Sons.
- Bhattacharya, D., Nagpure, A., & Gupta, R. K. 2007. "Bacterial Chitinases: Properties and Potential". *Critical Reviews in Biotechnology*, 27(1), 21-28.
- Bosquez-Molina, E., Ronquillo-de Jesús, E., Bautista-Baños, S., Verde-Calvo, J., & Morales-López, J. 2010. "Inhibitory Effect of Essential Oils Against *Colletotrichum gloeosporioides* and *Rhizopus stolonifer* in Stored Papaya Fruit and Their Possible Application in Coatings". *Postharvest Biology and Technology*, 57(2), 132-137.
- Brooker, R. J. 2005. *Genetics: Analysis & Principles*. McGraw-Hill Higher Education New York, NY.
- Brown, T. A. 2016. *Gene Cloning and DNA Analysis: An Introduction*. John Wiley & Sons.
- Brurberg, M. B., Eijsink, V. G., Haandrikman, A. J., Venema, G., & Nes, I. F. 1995. "Chitinase B from *Serratia marcescens* BJL200 is Exported to The Periplasm without Processing". *Microbiology*, 141(1), 123-131.
- Brurberg, M. B., Nes, I. F., & Eijsink, V. G. 1996. "Comparative Studies of Chitinases A and B from *Serratia marcescens*". *Microbiology*, 142(7), 1581-1589.
- Brurberg, M. B., Synstad, B., Klemsdal, S. S., van Aalten, D. M., Sundheim, L., & Eijsink, V. G. 2001. "Chitinases from *Serratia marcescens*". *Recent Research Development in Microbiology*, 5, 187-204.
- Brzezinska, M. S., Jankiewicz, U., Burkowska, A., & Walczak, M. 2014. "Chitinolytic Microorganisms and Their Possible Application in Environmental Protection". *Current Microbiology*, 68(1), 71-81.
- Cai, H., Archambault, M., & Prescott, J. F. 2003. "16S Ribosomal RNA Sequence-Based Identification of Veterinary Clinical Bacteria". *Journal of Veterinary Diagnostic Investigation*, 15(5), 465-469.
- Chowdappa, P., Chethana, C. S., Bharghavi, R., Sandhya, H., & Pant, R. P. 2012. "Morphological and Molecular Characterization of *Colletotrichum gloeosporioides* (Penz) Sac. Isolates Causing Anthracnose of Orchids in India". *Journal of Biotechnology Bioinformatics and Bioengineering*, 2(1), 567-572.
- Clarridge, J. E. 2004. "Impact of 16S rRNA Gene Sequence Analysis for Identification of Bacteria on Clinical Microbiology and Infectious Diseases". *Clinical Microbiology Reviews*, 17(4), 840-862.
- Correa-Cerro, L., Wassif, C., Wayne, J., Krakowiak, P., Cozma, D., Dobson, N., . . . Krajewska-Walasek, M. 2005. "DHCR7 Nonsense Mutations and

- Characterization of mRNA Nonsense Mediated Decay in Smith-Lemli-Opitz Syndrome". *Journal of Medical Genetics*, 42(4), 350-357.
- Dahiya, N., Tewari, R., & Hoondal, G. S. 2006. "Biotechnological Aspects of Chitinolytic Enzymes: A Review". *Applied Microbiology and Biotechnology*, 71(6), 773-782.
- Damiri, N. 2011. "Penggunaan Jamur dan Bakteri dalam Pengendalian Penyakit Tanaman secara Hayati yang Ramah Lingkungan". *Prosiding Semirata Bidang Ilmu-Ilmu Pertanian BKS-PTN Wilayah Barat*.
- Damm, U., Baroncelli, R., Cai, L., Kubo, Y., O'Connell, R., Weir, B., . . . Cannon, P. F. 2010. "Colletotrichum: Species, Ecology and Interactions". *International Mycological Association Fungus*, 1(2), 161-165.
- Danişmazoğlu, M., Demir, I., Sezen, K., Muratoğlu, H., & Nalçacıoğlu, R. 2015. "Cloning and Expression of Chitinase A, B, and C (chiA, chiB, chiC) Genes from *Serratia marcescens* Originating from *Helicoverpa armigera* and determining their activities". *Turkish Journal of Biology*, 39(1), 78-87.
- Davies, G., & Henrissat, B. 1995. "Structures and Mechanisms of Glycosyl Hydrolases". *Structure*, 3(9), 853-859.
- De Vleesschauwer, D., & Hofte, M. 2007. "Using *Serratia plymuthica* to Control Fungal Pathogens of Plants". *Centre Agriculture and Biosciences Reviews: Perspective in Agriculture, Veterinary Science, Nutrition and Natural Resources*. 2, No. 046.
- Dean, R., Van Kan, J. A., Pretorius, Z. A., Hammond-Kosack, K. E., Di Pietro, A., Spanu, P. D., . . . Ellis, J. 2012. "The Top 10 Fungal Pathogens in Molecular Plant Pathology". *Molecular Plant Pathology*, 13(4), 414-430.
- Divne, C., Ståhlberg, J., Teeri, T. T., & Jones, T. A. 1998. "High-resolution Crystal Structures Reveal How A Cellulose Chain is Bound in The 50 Å Long Tunnel of Cellobiohydrolase I from *Trichoderma reesei*". *Journal of Molecular Biology*, 275(2), 309-325.
- Djunaedy, A. 2009. "Biopestisida Sebagai Pengendali Organisme Pengganggu Tanaman (OPT) yang Ramah Lingkungan". *Embryo*, 6(1), 88-95.
- Downing, K. J., & Thomson, J. A. 2000. "Introduction of The *Serratia marcescens* chiA Gene into An Endophytic *Pseudomonas fluorescens* for The Biocontrol of Phytopathogenic Fungi". *Canadian Journal of Microbiology*, 46(4), 363-369.
- Edwards, D., Stajich, J., & Hansen, D. 2009. *Bioinformatics: Tools and Applications*. Springer Science & Business Media.
- Elgaml, A., Hassan, R., Barwa, R., Shokralla, S., & El-Naggar, W. 2013. "Analysis of 16S Ribosomal RNA Gene Segments for The Diagnosis of

- Gram Negative Pathogenic Bacteria Isolated from Urinary Tract Infections". *African Journal of Microbiology Research*, 7(23), 2862-2869.
- Elhamid, M., Makboul, H., Sedik, M., Ismail, I., & Ibrahim, M. 2010. "Cloning, Expression and Antifungal Activity of An Endochitinase Gene Derived from Barley (*Hordeum vulgare*) ". *Research Journal of Agriculture and Biological Sciences*, 6(3), 356-363.
- El Khaldi, R., Remadi, M., Hamada, W., Somai, L., & Cherif, M. 2015. "The Potential of *Serratia marcescens*: An Indigenous Strain Isolated from Date Palm Compost as Biocontrol Agent of *Rhizoctonia solani* on Potato". *Journal of Plant Pathology and Microbiology*, S3: 006. doi: 10.4172/2157-7471.S3-006.
- Enache, M., & Kamekura, M. 2010. "Hydrolytic Enzymes of Halophilic Microorganisms and Their Economic Values". *Romanian Journal of Biochemistry*, 47, 47-59.
- Ene, I. V., Walker, L. A., Schiavone, M., Lee, K. K., Martin-Yken, H., Dague, E., ... Brown, A. J. 2015. "Cell Wall Remodeling Enzymes Modulate Fungal Cell Wall Elasticity and Osmotic Stress Resistance". *MBio*, 6(4), e00986-00915.
- Fatchiyah. 2015. *Prinsip Dasar Bioinformatika*. UB Press Malang, 121 hlm.
- Fatchiyah, Arumingtyas, E., Widjarti, S., & Rahayu, S. 2011. *Biologi Molekuler (Prinsip Dasar Analisis)*. Erlangga Jakarta. 191 hml.
- Fatiah, R. 2016. *Kloning Gen Pengkode Kitinase A (ChiA) dari Isolat Bakteri Rhizosfer (Isolat UBCR_12)*. Skripsi. Fakultas Pertanian, Universitas Andalas, Padang. 53 hml.
- Frankowski, J., Lorito, M., Scala, F., Schmid, R., Berg, G., & Bahl, H. 2001. "Purification and Properties of Two Chitinolytic Enzymes of *Serratia plymuthica* HRO-C48". *Archives of Microbiology*, 176(6), 421-426.
- Fulekar, M. 2009. *Bioinformatics: Applications in Life and Environmental Sciences*. Springer Science & Business Media. ebooks, 247 p. ISBN: 9781402088803.
- Gaffar, S. 2007. *Biotehnologi Molekul (Buku Ajar)*. Jurusan Kimia FMIPA Universitas Padjadjaran Bandung.
- Gautam, A. K. 2005. "The Genera *Colletotrichum*: An Incitant of Numerous New Plant Diseases in India". *Phytopathology*, 58(1), 125.
- Gautam, A. K. 2014. "*Colletotrichum gloeosporioides*: Biology, Pathogenicity and Management in India". *Plant Physiology & Pathology*, 2(2), doi:10.4172/2329-955X.1000125.
- Gkarmiri, K., Finlay, R. D., Alström, S., Thomas, E., Cubeta, M. A., & Höglberg, N. 2015. "Transcriptomic Changes in The Plant Pathogenic Fungus

- Rhizoctonia solani* AG-3 in Response to The Antagonistic Bacteria *Serratia proteamaculans* and *Serratia plymuthica*". *BMC Genomics*, 16(1), 1.
- Gomaa, E. Z. 2012. "Chitinase Production by *Bacillus thuringiensis* and *Bacillus licheniformis*: Their Potential in Antifungal Biocontrol". *The Journal of Microbiology*, 50(1), 103-111.
- Graham, L. S., & Sticklen, M. B. 1994. "Plant Chitinases". *Canadian Journal of Botany*, 72(8), 1057-1083.
- Gupta, P., & Vakhlu, J. 2015. "Culturable Bacterial Diversity and Hydrolytic Enzymes from Drass, A Cold Desert in India". *African Journal of Microbiology Research*, 9(31), 1866-1876.
- Gupta, S., & Dikshit, A. 2010. "Biopesticides: An Ecofriendly Approach for Pest Control". *Journal of Biopesticides*, 3(1), 186-188.
- Hall, T. (2011). BioEdit: "An Important Software for Molecular Biology". *Green Earth Reserach Foundation Bulletin of Bioscience*, 2(1), 60-61.
- Herrington, M. B. 2001. *Nonsense Mutation and Suppression*. John Wiley & Sons, Ltd., diakses dari <http://onlinelibrary.wiley.com> pada tanggal 28 Juli 2017; 07.16 Wib.
- Homthong, M., Kubera, A., Srihuttagum, M., & Hongtrakul, V. 2016. "Isolation and Characterization of Chitinase from Soil Fungi, Paecilomyces sp". *Agriculture and Natural Resources*, 50(4), 232-242.
- Horn, S., Sørlie, M., Vaaje-Kolstad, G., Norberg, A., Synstad, B., Vårum, K., & Eijsink, V. 2006a. "Comparative Studies of Chitinases A, B and C from *Serratia marcescens*". *Biocatalysis and Biotransformation*, 24(1-2), 39-53.
- Horn, S. J., Sørbotten, A., Synstad, B., Sikorski, P., Sørlie, M., Vårum, K. M., & Eijsink, V. G. 2006b. Endo/exo Mechanism and Processivity of Family 18 Chitinases Produced by *Serratia marcescens*. *The Federation of European Biochemical Societies Journal*, 273(3), 491-503.
- Horn, S. J., Sikorski, P., Cederkvist, J. B., Vaaje-Kolstad, G., Sorlie, M., Synstad, B., Vriend, G., Varum, K. M., & Eijsink, V. G. H. "Costs and Benefits of Processivity in Enzymatic Degradation of Recalcitrant Polysaccharides". *Proceedings of the National Academy of Sciences*, 103 (48), 18089-18094.
- Huang, X., Tian, B., Niu, Q., Yang, J., Zhang, L., & Zhang, K. 2005. "An Extracellular Protease from *Brevibacillus laterosporus* G4 without Parasporal Crystals can Serve as A Pathogenic Factor in Infection of Nematodes". *Research in Microbiology*, 156(5), 719-727.
- Hung, C.-L., & Lin, C.-Y. 2013. "Open Reading Frame Phylogenetic Analysis on The Cloud". *International Journal of Genomics*. Article ID: 614923, doi: 10.1155/2013/614923; 9 p.

- Igarashi, K., Uchihashi, T., Uchiyama, T., Sugimoto, H., Wada, M., Suzuki, K., Sakuda, S., Ando, T., Watanabe, T., & Samejima, M. 2014. "Two-Way Traffic of Glycoside Hydrolase Family 18 Processive Chitinase on Crystalline Chitin". *Nature Communications*, 5, 3975.
- Indratmi, D. 2002. "Pengujian Potensi Yeast Like-Fungsi *Schizosaccharomyces* sp. untuk Pengendalian *Colletotrichum gloeosporioides* pada Tanaman Cabai". *Jurnal Tropika* <http://ejournal.umm.ac.id/index.php/tropika/article/view/334> [diakses 25 Mei 2015].
- Irawan, A., Anggraeni, I., & Christita, M. (2015). "Identification Causes Leaf Spot Disease in Cempaka (*Magnolia elegans* (Blume.) H. Keng) Seedling and Its Control Techniques (Identifikasi Penyebab Penyakit Bercak Daun Pada Bibit Cempaka (*Magnolia Elegans* (Blume.) H. Keng) dan Teknik Pengendaliannya". *Jurnal Wasian*, 2(2), 87-94.
- Irawan, B. 2003. "Agribisnis Hortikultura: Peluang dan Tantangan dalam Era Perdagangan Bebas". *SOCA (Socio-Economic of Agriculture and Agribusiness)*, 3(2), 1-22.
- Issac, S. 1991. *Fungal-Plant Interactions*. Springer Science & Business Media, Netherlands. 418 pp.
- Isenbarger, T. A., Carr, C. E., Johnson, S. S., Finney, M., Church, G. M., Gilbert, W., . . . Ruvkun, G. (2008). "The Most Conserved Genome Segments for Life Detection on Earth and Other Planets". *Origins of Life and Evolution of Biospheres*, 38(6), 517-533.
- Isik, K., Gencbay, T., Özdemir-Kocak, F., & Cil, E. 2014. "Molecular Identification of Different Actinomycetes Isolated from East Black Sea Region Plateau Soil by 16S rDNA Gene Sequencing". *African Journal of Microbiology Research*, 8(9), 878-887.
- Jamsari. 2007. *Bioteknologi Pemula (Prinsip Dasar dan Aplikasi Analisis Molekuler)*. Unri Press Pekanbaru. 193 hlm.
- Jana, S., Hamre, A. G., Wildberger, P., Holen, M. M., Eijsink, V. G. H., Beckham, G. T., Sorlie, M., & Payne, C. M. 2016. "Aromatic-mediated Carbohydrate Recognition in Processive *Serratia mmarcescens* Chitinases". *The Journal of Physical Chemistry B*, 120 (7), 1236-1249.
- Jia, B., & Jeon, C. O. (2016). "High-throughput Recombinant Protein Expression in *Escherichia coli*: Current Status and Future Perspectives". *Open Biology*, 6(8), 160196.
- Kabir, K. E., Sugimoto, H., Tado, H., Endo, K., Yamanaka, A., Tanaka, S., & Koga, D. 2006. "Effect of *Bombyx mori* Chitinase Against Japanese Pine Sawyer (*Monochamus alternatus*) Adults as A Biopesticide". *Bioscience, Biotechnology, and Biochemistry*, 70(1), 219-229.

- Kamelia, R. 2016. *Pemurnian Parsial dan Karakterisasi Enzim Kitinolitik Ekstraseluler dari Bakteri Rhizosfer Isolat UBCR_12 dan Aplikasinya sebagai Senyawa Antijamur terhadap Jamur Colletotrichum gloeosporioides*. Tesis. Program Pascasarjana Jurusan Kimia Fakultas MIPA Universitas Andalas Padang, 76 hlm.
- Kaomek, M., Mizuno, K., Fujimura, T., Sriyotha, P., & Cairns, J. R. K. (2003). "Cloning, Expression, and Characterization of An Antifungal Chitinase from *Leucaena leucocephala* de Wit". *Bioscience, Biotechnology, and Biochemistry*, 67(4), 667-676.
- Kardinan, A. 2011. "Penggunaan Pestisida Nabati sebagai Kearifan Lokal dalam Pengendalian Hama Tanaman menuju Sistem Pertanian Organik". *Pengembangan Inovasi Pertanian*, 4(4), 262-278.
- Keese, P., & Graf, L. (1996). "A Positive Screen for Cloning PCR Products". *Nucleic Acids Research*, 24(17), 3474-3475.
- Kelley, L. A., Mezulis, S., Yates, C. M., Wass, M. N., & Sternberg, M. J. 2015. "The Phyre2 Web Portal for Protein Modeling, Prediction and Analysis". *Nature Protocols*, 10(6), 845-858.
- Kim, J. S., & Je, Y. H. 2010. "A Novel Biopesticide Production: Attagel-Mediated Precipitation of Chitinase from *Beauveria bassiana* SF-205 Supernatant for Thermotolerance". *Applied Microbiology and Biotechnology*, 87(5), 1639-1648.
- Kim, K.-H., Kim, Y.-O., Ko, B.-S., Youn, H.-J., & Lee, D.-S. 2004. "Over-expression of The Gene (bglBC1) from *Bacillus circulans* Encoding An Endo- β -(1→ 3), (1→ 4)-glucanase Useful for The Preparation of Oligosaccharides from Barley β -glucan". *Biotechnology Letters*, 26(22), 1749-1755.
- Klug, W. S., Cummings, M. R., Spencer, C. A., Palladino, M. A., & Ward, S. M. 2009. *Concepts of Genetics* (Vol.9): Pearson.
- Koonin, E. V., & Galperin, M. Y. 2003. *Sequence - Evolution - Function : Computational Approaches in Comparative Genomics*. Boston: Kluwer Academic (<https://www.ncbi.nlm.nih.gov/books/NBK20255/>), Chapter 2 - Evolutionary Concept in Genetics and Genomics.
- Koonin, E. V. (2014). "Carl Woese's Vision of Cellular Evolution and The Domains of Life". *RNA Biology*, 11(3), 197-204.
- Kopecká, M. 2013. "Yeast and Fungal Cell-wall Polysaccharides can Self-assemble In Vitro into An Ultrastructure Resembling In Vivo Yeast Cell Walls". *Microscopy*, 62(3), 327-339.
- Korkmaz, G., Holm, M., Wiens, T., & Sanyal, S. 2014. "Comprehensive Analysis of Stop Codon Usage in Bacteria and Its Correlation with Release Factor Abundance". *Journal of Biological Chemistry*, 289 (44), 30334-30342.

- Kurze, S., Bahl, H., Dahl, R., & Berg, G. 2001. "Biological Control of Fungal Strawberry Diseases by *Serratia plymuthica* HRO-C48". *Plant Disease*, 85(5), 529-534.
- Latgé, J. P. 2007. "The Cell Wall: A Carbohydrate Armour for The Fungal Cell". *Molecular Microbiology*, 66(2), 279-290.
- Lau, S., Woo, P., Teng, J., Leung, K., & Yuen, K. 2002. "Identification by 16S Ribosomal RNA Gene Sequencing of *Arcobacter butzleri* Bacteraemia in a Patient with Acute Gangrenous Appendicitis". *Journal of Clinical Pathology*, 55(3), 182.
- Levy, I., Shani, Z., & Shoseyov, O. 2002. "Modification of Polysaccharides and Plant Cell Wall by Endo-1, 4- β -glucanase and Cellulose-binding Domains". *Biomolecular Engineering*, 19(1), 17-30.
- Li, H., & Greene, L. H. 2010. "Sequence and Structural Analysis of The Chitinase Insertion Domain Reveals Two Conserved Motifs Involved in Chitin-binding". *PloS One*, 5(1), e8654.
- Liu, D., Cai, J., Xie, C.-c., Liu, C., & Chen, Y.-h. 2010. "Purification and Partial Characterization of a 36-kDa Chitinase from *Bacillus thuringiensis* subsp. *colmeri*, and Its Biocontrol Potential". *Enzyme and Microbial Technology*, 46(3), 252-256.
- Liu, Y., Chen, Z., Ng, T., Zhang, J., Zhou, M., Song, F., . . . Liu, Y. 2007. "Bacisubin, An Antifungal Protein with Ribonuclease and Hemagglutinating Activities from *Bacillus subtilis* strain B-916". *Peptides*, 28(3), 553-559.
- Liu, Y., & Yang, Q. (2007). "Cloning and Heterologous Expression of Aspartic Protease SA76 Related to Biocontrol in *Trichoderma harzianum*". *Federation of European Microbiological Societies (Microbiology Letters)*, 277(2), 173-181.
- Liu, Y., & Yang, Q. (2013). "Cloning and Heterologous Expression of Serine Protease SL41 Related to Biocontrol in *Trichoderma harzianum*". *Journal of Molecular Microbiology and Biotechnology*, 23(6), 431-439.
- Lubis, A. A. 2016. *Kloning Gen Chitinase C (ChiC) berbasis PCR dari Bakteri Rhizosfer Isolat UBCR_12*. Skripsi. Fakultas Pertanian, Universitas Andalas, Padang. 51 hlm.
- Madhuprakash, J., Bobbili, K. B., Moerschbacher, B. M., Singh, T. P., Swamy, M. J., & Podile, A. R. 2015. "Inverse Relationship between Chitobiase and Transglycosylation Activities of Chitinase-D from *Serratia proteamaculans* Revealed by Mutational and Biophysical Analyses". *Scientific Reports*, 5.
- Marchler-Bauer, A., Anderson, J. B., Cherukuri, P. F., DeWeese-Scott, C., Geer, L. Y., Gwadz, M., . . . Ke, Z. 2005. "CDD: a Conserved Domain Database

- for Protein Classification". *Nucleic Acids Research*, 33(suppl 1), D192-D196.
- Marchler-Bauer, A., Derbyshire, M. K., Gonzales, N. R., Lu, S., Chitsaz, F., Geer, L. Y., . . . Hurwitz, D. I. 2014. "CDD: NCBI's Conserved Domain Database". *Nucleic Acids Research*, gku1221.
- Marchler-Bauer, A., Zheng, C., Chitsaz, F., Derbyshire, M. K., Geer, L. Y., Geer, R. C., . . . Lanczycki, C. J. 2012. "CDD: Conserved Domains and Protein Three-dimensional Structure". *Nucleic Acids Research*, gks1243.
- Moebius, N., Üzüm, Z., Dijksterhuis, J., Lackner, G., & Hertweck, C. 2014. "Active Invasion of Bacteria into Living Fungal Cells". *Elife*, 3, e03007.
- Moreno, A. B., Del Pozo, Á. M., & San Segundo, B. 2006. "Biotechnologically Relevant Enzymes and Proteins". *Applied Microbiology and Biotechnology*, 72(5), 883.
- Mori, H., Borowsky, A. D., Bhat, R., Ghajar, C. M., Seiki, M., & Bissell, M. J. 2012. "Laser Scanning-based Tissue Autofluorescence/fluorescence Imaging (LS-TAFI), A New Technique for Analysis of Microanatomy in Whole-mount Tissues". *The American Journal of Pathology*, 180(6), 2249-2256.
- Nagata, Y., Futamura, A., Miyauchi, K., & Takagi, M. 1999. "Two Different Types of Dehalogenases, LinA and LinB, Involved in γ -Hexachlorocyclohexane Degradation in *Sphingomonas paucimobilis* UT26 Are Localized in the Periplasmic Space without Molecular Processing". *Journal of Bacteriology*, 181(17), 5409-5413.
- Nelson, S. C. 2008. "Mango Anthracnose (*Colletotrichum gloeosporioides*)": University of Hawai'i at Manoa, College of Tropical Agriculture and Human Resources, Cooperative Extension Service.
- Nema, V., & Pal, S. K. 2013. "Exploration of Freely Available Web-interfaces for Comparative Homology Modelling of Microbial Proteins". *Bioinformation*, 9(15), 796-801.
- Neupane, S., Finlay, R. D., Alström, S., Goodwin, L., Kyrpides, N. C., Lucas, S., . . . Peters, L. 2012. "Complete Genome Sequence of *Serratia plymuthica* strain AS12". *Standards in Genomic Sciences*, 6(2), 165.
- Ngullie, M., Daiho, L., & Upadhyay, D. 2010. "Biological Management of Fruit Rot in The World's Hottest Chilli (*Capsicum chinense* Jacq.)". *Journal of Plant Protection Research*, 50(3), 269-273.
- Nicholl, D. S. (2008). *An Introduction to Genetic Engineering*: Cambridge University Press.
- Norberg, A. L., Dybvik, A. I., Zakariassen, H., Mormann, M., Peter-Katalinic, J., Eijsink, V. G., & Sorlie, M. 2011. "Substrate Positioning in Chitinase A, A

- Processive Chito-biohydrolase from *Serratia marcescens*". *The Federation of European Biochemical Societies Journal: Letters*, 585 (14), 2339-2344.
- Okay, S., & Özcengiz, G. 2011. "Molecular Cloning, Characterization, and Homologous Expression of An Endochitinase Gene from *Bacillus thuringiensis* serovar morrisoni". *Turkish Journal of Biology*, 35(1), 1-7.
- Onofre, S. B., & Antoniazzi, D. 2014. "Behavior of The Fungus *Colletotrichum gloeosporioides* (Penz & Sacc.), which Causes Bitter Rot in Apples after Harvesting". *Advances in Microbiology*. Vol. 4, No. 4. doi: 10.4236/aim.2014.44026.
- Osborne, C. A., Galic, M., Sangwan, P., & Janssen, P. H. 2005. "PCR-generated Artefact from 16S rRNA Gene-specific Primers". *Federation of European Microbiological Societies (Microbiology Letters)*, 248(2), 183-187.
- Padmanabhan, S., Banerjee, S., & Mandi, N. 2011. *Screening of Bacterial Recombinants: Strategies and Preventing False Positives (Molecular Cloning-Selected Applications in Medicine and Biology)*. : InTech. doi: 10.5772/898 diakses dari <https://www.intechopen.com/books/molecular-cloning-selected-applications-in-medicine-and-biology> pada tanggal 21 Mei 2017.
- Parani, K., Shetty, G., & Saha, B. 2011. "Isolation of *Serratia marcescens* SR1 as A Source of Chitinase Having Potentaility of Using as A Biocontrol Agent". *Indian Journal of Microbiology*, 51(3), 247-250.
- Patil, R. S., Ghormade, V., & Deshpande, M. V. 2000. "Chitinolytic enzymes: an exploration". *Enzyme and Microbial Technology*, 26(7), 473-483.
- Payne, C. M., Baban, J., Horn, S. J., Backe, P. H., Arvai, A. S., Dalhus, B., . . . Beckham, G. T. 2012. "Hallmarks of Processivity in Glycoside Hydrolases from Crystallographic and Computational Studies of the *Serratia marcescens* Chitinases". *Journal of Biological Chemistry*, 287(43), 36322-36330.
- Pearson, W. R. 2013. "An Introduction to Sequence Similarity ("homology") Searching". *Current Protocols in Bioinformatics*, 3.1. 1-3.1. 8.
- Ploetz, R. 2004. "Tropical Fruit Crops and The Diseases that Affect Their Production". *Tropical Biology and Conservation*, 1, 36.
- Queiroz, B. P. V. d., & Melo, I. S. d. 2006. "Antagonism of *Serratia marcescens* towards *Phytophthora parasitica* and Its Effects in Promoting The Growth of Citrus". *Brazilian Journal of Microbiology*, 37(4), 448-450.
- Rainey, S., & Repka, J. 2006. "Quantitative Sequence and Open Reading Frame Analysis based on Codon Bias". *Systemics, Cybernetics and Informatics*, 4(1), 65-72.

- Ramos, A. E., Muñoz, M., Moreno-Pérez, D. A., & Patarroyo, M. A. 2017. "pELMO, An Optimised In-house Cloning Vector". *AMB Express*, 7(1), 26.
- Rinanda, T. 2011. "Analisis Sekuensing 16s rRNA di Bidang Mikrobiologi". *Jurnal Kedokteran Syiah Kuala*, 11(3), 172-177.
- Riwany, F. 2012. *Identifikasi Isolat Bakteri Rizosfer yang Memiliki Potensi Menekan Pertumbuhan Jamur Colletotrichum sp. pada Tanaman Cabai*. Skripsi. Fakultas Pertanian Universitas Andalas Padang.
- Rouvinen, J., Bergfors, T., Teeri, T., Knowles, J., & Jones, T. 1990. "Three-dimensional structure of cellobiohydrolase II from *Trichoderma reesei*". *Science*, 249(4967), 380-387.
- Saier, M. H. 2006. "Protein Secretion and Membrane Insertion Systems in Gram-Negative Bacteria". *The Journal of Membrane Biology*, 214(1-2), 75-90.
- Saier, M. H., Ma, C. H., Rodgers, L., Tamang, D. G., Yen, M. R., Laskin, A., . . . Gadd, G. 2008. "Protein Secretion and Membrane Insertion Systems in Bacteria and Eukaryotic Organelles". *Advances in Applied Microbiology*, 65, 141-197.
- Salazar, O., González, I., & Genilloud, O. 2002. "New Genus-specific Primers for the PCR Identification of Novel Isolates of The Genera Nocardiopsis and Saccharothrix". *International Journal of Systematic and Evolutionary Microbiology*, 52(4), 1411-1421.
- Setia, I. N. 2015. "Chitinolytic Assay and Identification of Bacteria Isolated from Shrimp Waste Based on 16S rDNA Sequences". *Advances in Microbiology*, 5(7), 541-548.
- Shakhbazau, A., & Kartel', N. 2008. "Chitinases in Bioengineering Research". *Russian Journal of Genetics*, 44(8), 881-889.
- Sharma, P., Rastogi, A., Kukreti, K., & Narwal, P. S. 2012. "Sensitivity Assay of Polymerase Chain Reaction for Detection of Canine Parvo Virus infection in dogs". *Open Journal of Clinical Diagnostics*, 2(03), 45.
- Sherwood, A. L. 2003. "Virtual Elimination of False Positives in Blue-white Colony Screening". *BioTechniques*, 34(3), 644-647.
- Shin, K.-S., Kwon, N.-J., Kim, Y. H., Park, H.-S., Kwon, G.-S., & Yu, J.-H. (2009). "Differential Roles of The ChiB Chitinase in Autolysis and Cell Death of *Aspergillus nidulans*". *Eukaryotic Cell*, 8(5), 738-746.
- Soltani, J., Haghghi, M. Y.-P., & Nazeri, S. 2014. "Light, Temperature, and Aging Dependent Vegetative Growth and Sporulation of *Colletotrichum gloeosporioides* on Different Culture Media". *Journal of Medicinal Plants Research*, 8(4), 208-216.

- Someya, N., Nakajima, M., Hirayae, K., Hibi, T., & Akutsu, K. 2001. "Synergistic Antifungal Activity of Chitinolytic Enzymes and Prodigiosin Produced by Biocontrol Bacterium, *Serratia marcescens* strain B2 against Gray Mold Pathogen, *Botrytis cinerea*". *Journal of General Plant Pathology*, 67(4), 312-317.
- Souto, G., Correa, O., Montecchia, M., Kerber, N., Pucheu, N., Bachur, M., & Garcia, A. 2004. "Genetic and Functional Characterization of a *Bacillus* sp. Strain Excreting Surfactin and Antifungal Metabolites Partially Identified as Iturin-like Compounds". *Journal of Applied Microbiology*, 97(6), 1247-1256.
- Stergiopoulos, I., Kourmpetis, Y. A., Slot, J. C., Bakker, F. T., De Wit, P. J., & Rokas, A. 2012. "In Silico Characterization and Molecular Evolutionary Analysis of A Novel Superfamily of Fungal Effector Proteins". *Molecular Biology and Evolution*, 29(11), 3371-3384.
- Stopinšek, S., Terčelj, M., Salobir, B., Wra, B., Ihan, A., Rylander, R., & Simčič, S. 2010. "Effects of Fungal Cell Wall Polysaccharides and Lipopolysaccharide on In Vitro Tumour Necrosis Factor Alpha Production by Peripheral Blood Mononuclear Cells of Sarcoidosis Patients". *Zdravniški Vestnik*, 79(10).
- Suzuki, K., Sugawara, N., Suzuki, M., Uchiyama, T., Katouno, F., Nikaidou, N., & Watanabe, T. 2002. "Chitinases A, B, and C1 of *Serratia marcescens* 2170 produced by recombinant *Escherichia coli*: enzymatic properties and synergism on chitin degradation". *Bioscience, Biotechnology, and Biochemistry*, 66(5), 1075-1083.
- Suzuki, K., Taiyoji, M., Sugawara, N., Nikaidou, N., Henrissat, B., & Watanabe, T. 1999. "The Third Chitinase Gene (chiC) of *Serratia marcescens* 2170 and The Relationship of Its Product to Other Bacterial Chitinases". *Biochemical Journal*, 343(3), 587-596.
- Syabana, M. A., & Syafendra, Y. 2013. "Pengendalian Penyakit Antraknosa (*Colletotrichum capsici*) pada Cabai Merah dengan Beberapa Bakteri sebagai Agen Biokontrol". *Jurnal Agroekoteknologi*, 5(1).
- Synstad, B., Gåseidnes, S., Van Aalten, D. M., Vriend, G., Nielsen, J. E., & Ejsink, V. G. 2004. "Mutational and Computational Analysis of The Role of Conserved Residues in The Active Site of a Family 18 Chitinase". *European Journal of Biochemistry*, 271(2), 253-262.
- Tamura, K., Stecher, G., Peterson, D., Filipski, A., & Kumar, S. (2013). MEGA6: "Molecular Evolutionary Genetics Analysis version 6.0". *Molecular Biology and Evolution*, 30(12), 2725-2729.
- Than, P., Jeewon, R., Hyde, K., Pongsupasamit, S., Mongkolporn, O., & Taylor, P. 2008b. "Characterization and Pathogenicity of *Colletotrichum* Species Associated with Anthracnose on Chilli (*Capsicum* spp.) in Thailand". *Plant Pathology*, 57(3), 562-572.

- Than, P. P., Prihastuti, H., Phoulivong, S., Taylor, P. W., & Hyde, K. D. 2008a. "Chilli Anthracnose Disease caused by *Colletotrichum* Species". *Journal of Zhejiang University Science B*, 9(10), 764.
- Tjalsma, H., Antelmann, H., Jongbloed, J. D., Braun, P. G., Darmon, E., Dorenbos, R., . . . Quax, W. J. 2004. "Proteomics of Protein Secretion by *Bacillus subtilis*: Separating The "Secrets" of The Secretome". *Microbiology and Molecular Biology Reviews*, 68(2), 207-233.
- Tsuji, K., Tsien, H., Hanson, R., DePalma, S., Scholtz, R., & LaRoche, S. (1990). "16S Ribosomal RNA Sequence Analysis for Determination of Phylogenetic Relationship among Methylotrophs". *Microbiology*, 136(1), 1-10.
- Uchiyama, T., Katouno, F., Nikaidou, N., Nonaka, T., Sugiyama, J., & Watanabe, T. 2001. "Roles of the Exposed Aromatic Residues in Crystalline Chitin Hydrolysis by Chitinase A from *Serratia marcescens* 2170". *Journal of Biological Chemistry*, 276(44), 41343-41349.
- Untergasser, A., Nijveen, H., Rao, X., Bisseling, T., Geurts, R., & Leunissen, J. A. (2007). "Primer3Plus, An Enhanced Web Interface to Primer3". *Nucleic Acids Research*, 35(suppl_2), W71-W74.
- Vaaje-Kolstad, G., Horn, S. J., Sørlie, M., & Eijsink, V. G. 2013. "The Chitinolytic Machinery of *Serratia marcescens*-A Model System for Enzymatic Degradation of Recalcitrant Polysaccharides". *The Federation of European Biochemical Societies Journal*, 280(13), 3028-3049.
- Van Aalten, D., Komander, D., Synstad, B., Gåseidnes, S., Peter, M., & Eijsink, V. 2001. "Structural insights into the catalytic mechanism of a family 18 exo-chitinase". *Proceedings of the National Academy of Sciences*, 98(16), 8979-8984.
- Van Aalten, D., Synstad, B., Brurberg, M., Hough, E., Riise, B., Eijsink, V., & Wierenga, R. 2000. "Structure of A Two-domain Chitotriosidase from *Serratia marcescens* at 1.9-Å Resolution". *Proceedings of the National Academy of Sciences*, 97(11), 5842-5847.
- Verheyen, J. 2015. *Sulfolobus acidocaldarius* & *Sulfolobus solfataricus*: *Exploitation of Thermoacidophilic Archaea for Biotechnological Applications*. Dissertation. Universitätsbibliothek Duisburg-Essen; http://duepublico.uni-duisburg-essen.de/servlets/DerivateServlet/Derivate-39494/Diss_Julia_Verheyen.pdf [diakses 2 Juni 2017]; 118 p.
- Villegas, A., & Kropinski, A. M. 2008. "An Analysis of Initiation Codon Utilization in The Domain Bacteria-concerns about The Quality of Bacteria Genome Annotation". *Microbiology*, 154(9), 2559-2661.
- Wang, K., Yan, P.-s., Cao, L.-x., Ding, Q.-l., Shao, C., & Zhao, T.-f. 2013. "Potential of Chitinolytic *Serratia marcescens* strain JPP1 for Biological

- Control of *Aspergillus parasiticus* and Aflatoxin". *BioMed Research International*. Article ID: 397142. <http://dx.doi.org/10.1155/2013/397142>.
- Weir, B., Johnston, P., & Damm, U. 2012. "The *Colletotrichum gloeosporioides* Species Complex". *Studies in Mycology*, 73, 115-180.
- Wharton, P. S., & Diéguez-Uribeondo, J. 2004. "The Biology of *Colletotrichum acutatum*". *Paper presented at the Anales del Jardín Botánico de Madrid*.
- Wiyono, S. 2014. "Formulasi Tepung Biofungisida Berbahan Aktif Ganda *Pseudomonas fluorescens* PG 01 dan *Bacillus polymixia* BG 25". *Jurnal Ilmu Pertanian Indonesia*, 17(3), 180-185.
- Xiao, C., MacKenzie, S., & Legard, D. 2004. "Genetic and Pathogenic Analyses of *Colletotrichum gloeosporioides* Isolates from Strawberry and Noncultivated Hosts". *Phytopathology*, 94(5), 446-453.
- Yakoby, N., Beno-Moualem, D., Keen, N. T., Dinoor, A., Pines, O., & Prusky, D. 2001. "*Colletotrichum gloeosporioides* pelB is An Important Virulence Factor in Avocado Fruit-fungus Interaction". *Molecular Plant-Microbe Interactions*, 14(8), 988-995.
- Yan, Q., & Fong, S. S. 2015. "Bacterial Chitinase: Nature and perspectives for sustainable bioproduction". *Bioresources and Bioprocessing*, 2(1), 31.
- Yang, C., Zhu, Y., Magee, D. M., & Cox, R. A. 1996. "Molecular Cloning and Characterization of The *Coccidioides immitis* Complement Fixation/chitinase Antigen". *Infection and Immunity*, 64(6), 1992-1997.
- Yani, R. H. 2012. *Seleksi Bakteri Antagonis dari Tanaman Sawi (*Brassica juncea* L.) sebagai Biofungisida Terhadap *Colletotrichum gloeosporioides* Penyebab Antraknosa pada Tanaman Cabai (*Capsicum sp.*)*. Skripsi. Fakultas Pertanian Universitas Andalas Padang.
- Ye, J., Coulouris, G., Zaretskaya, I., Cutcutache, I., Rozen, S., & Madden, T. L. (2012). "Primer-BLAST: A Tool to Design Target-specific Primers for Polymerase Chain Reaction". *BMC Bioinformatics*, 13(1), 134.
- Yuli, P. E., Suhartono, M. T., Rukayadi, Y., Hwang, J. K., & Pyun, Y. R. 2004. "Characteristics of Thermostable Chitinase Enzymes from The Indonesian *Bacillus* sp. 13.26". *Enzyme and Microbial Technology*, 35(2), 147-153.
- Yulia, E., & Widiantini, F. 2007. "Potensi Bakteri Antagonis Filoplen Daun Mangga dalam Menekan Penyakit Antraknosa Buah Mangga (*Mangifera indica* L.)". *Jurnal Agrikultura*, 18(1), 53-59.
- Yuwono, T. 2005. *Biologi molekular*. Erlangga. Jakarta.
- Zarei, M., Aminzadeh, S., Zolgharnein, H., Safahieh, A., Daliri, M., Noghabi, K. A., . . . Motallebi, A. 2011. "Characterization of A Chitinase with Antifungal Activity from A Native *Serratia marcescens* B4A". *Brazilian Journal of Microbiology*, 42(3), 1017-1029.

- Zees, A. C., Pyrpassopoulos, S., & Vorgias, C. E. 2009. "Insights Into The Role of The $\alpha+\beta$ Insertion in The TIM-barrel Catalytic Domain, Regarding The Stability and The Enzymatic Activity of Chitinase A from *Serratia marcescens*". *Biochimica et Biophysica Acta (BBA)-Proteins and Proteomics*, 1794(1), 23-31.
- Zhang, C., Zhao, X., Han, F., Yang, M., Chen, H., Chida, T., & Shen, S. 2009. "Comparative Proteome Analysis of Two Antagonist *Bacillus subtilis* strains". *Journal of Microbiology and Biotechnology*, 19(4), 351-357.
- Zhang, Z., & Yuen, G. Y. 2000. "The Role of Chitinase Production by *Stenotrophomonas maltophilia* strain C3 in Biological Control of *Bipolaris sorokiniana*". *Phytopathology*, 90(4), 384-389.
- Zhu, Y., Pan, J., Qiu, J., & Guan, X. 2008. "Isolation and Characterization of A Chitinase Gene from Entomopathogenic Fungus *Verticillium lecanii*". *Brazilian Journal of Microbiology*, 39(2), 314-320.
- Zia, A. & Moses, A. M. 2011. "Ranking Insertion, Deletion and Nonsense Mutations based on Their Effect on Genetic Information". *BMC Bioinformatics*, 12(1), 299.

