

## DAFTAR PUSTAKA

- Agarwal, P., Gupta, R., & Imneet Kaur Gill. (2018). Importance of bio-fertilizers in agriculture. *International Research Journal of Agricultural Economics and Statistics*, 9(3), 1–3.
- Agrios, G. (1997). *Control of Plant Diseases. In: Plant Pathology* (4th Editio). Academic Press.
- Akhsan, N. (1996). Study of the occurrence and population density of *Fusarium oxysporum* f. spp. *lycopersici* at Palaran, Loa Janan and Tanah Merah. *Bulrtin Budidaya Nasional*, 2(1), 11–16. <http://agris.fao.org/agris-search/search.do?recordID=ID1998001240>
- Alexopoulos, C. J., & Mims, C. W. (1979). *Introductory Mycology*. (3rd Editio). John Willey & Sons.
- Alfizar, Marlina, & Fitri, S. (2013). Kemampuan Antagonis *Trichoderma* sp. terhadap Beberapa Jamur Patogen in Vitro. *Journal Floratek*, 8(1). <https://doi.org/1907-2686>
- Bautista-Bañõs, S., Hernández-Lauzardo, A. N., Velázquez-del Valle, M. G., Hernández-López, M., Ait Barka, E., & Bosquez-Molina, E. (2006). Chitosan as a potential natural compound to control pre and postharvest diseases of horticultural commodities. *Corp Protection*, 25, 108–118.
- Beasley, M., Eric, J., Bartelink, Taylor, L., & Randy, M. . (2014). Comparisson of Transmission FTIR,ATR, and DRIFT Spectra : Implications for Assesment of Bone Bioapatite Diagenesis. *Journnal of Archaeological Science*, 46, 16–22.
- Behera, B., Yadav, H., Singh, S. ., Mishra, R. ., Sethi, B. ., Dutta, S. ., & Thatoi, H. . (2017). Phosphate solubilization and acid phosphatase activity of *Serratia* sp. isolated from mangrove soil of Mahanadi river delta, Odisha. *Indian Journal Genetic Engineering Biotechnology*, 15, 169–178.
- Bhardwaj, D., Ansari, M., Sahoo, R., & Tuteja, N. (2014). Biofertilizers function as key player in sustainable agriculture by improving soil fertility, plant tolerance and crop productivity. *Journal Microbial Cell Factories*, 13(1), 1.
- Blagodatskikh, I. V., Kulikov, S. N., Oxana, V., Bezrodnykh, E. A., & Tikhonov, V. E. (2017). *N-Reacetylated Oligochitosan : pH dependence of Self-Assembly Properties and Antibacterial Activity*. <https://doi.org/10.1021/acs.biomac.7b00039>
- Cabrera, J. C., Messiaen, J., Cambier, P., & Van Cutsem, P. (2006). Size, acetylation and concentration of chitoooligosaccharide elicitors determine the Switch From Defence Involving PAL Activation To Cell Death And Water Peroxide Production In Arabidopsis Cell Suspensions. *Physiologia Plantarum*, 127, 44–56.

- Campbell NA, Reece JB, Urry LA, Cain ML, Wasserman SA, Minorsky PV. (2004). *Biologi. 5<sup>th</sup> edition*. Jakarta. Penerbit Erlangga.
- Chapiro, A. (1962). *General Aspect of Radiation Initiated Polymerization, Radiation Chemistri of Polymeric system*. Interscience Publisher, John Willey & Sons.
- Chernin, K., Z., Ismailov, S., Haran, & Chet, I. (1995). Chitinolytic Enterobacter agglomerans Antagonistic to Fungal Plant Pathogens. *Application of Environmental Microbiology*, 61(5), 1720–172.
- Cyrus, H., Subbarow, Fiske, & Yellapragada. (1925). The Colorimetric Determination Of Phosphorus. *Journal Biological Chemistry*, 66, 373–400. <http://www.jbc.org/content/66/2/375.citation>
- Darjanto, L. . (1995). *Pengaruh Laju Dosis dan Dosis Iradiasi Gamma Cobalt-60 terhadap Jumlah sel dan Harga D10 Salmonella spp pada Media NA dan BHI Agar*. Universitas Padjajaran, Bandung.
- Darwis, D., T. Puspitasari., D. Iramani., Sri Susilowati., D.S. Pangerteni. (2015). Preparation of Low Molecular Weight Chitosan by Radiation and Its Application for Plant Growth Promoter. *Document of IAEA chapter 10*. National Nuclear Energy Agency, Centre for Application of Istopes and Radiation Technology, Indonesia.
- Das, S., Madhuprakash, J., Sarma, P. V. S. R. ., Purushotham, P., Suma, K., Manjeet, K., & Podile, A. . (2015). Biotechnological Approaches For Field Aplication Of Chitooligosaccharides (COS) To Induce Innate Immunity In Plants. *Critical Reviews in Biotechnology*, 35, 29–43. DOI: [10.3109/07388551.2013.798255](https://doi.org/10.3109/07388551.2013.798255)
- Djajakirana, G. (2002). Pemanfaatan Bahan Organik untuk Meningkatkan Produktivitas Tanaman. *Jurnal Tanah Dan Iklim*, 20, 35–46.
- Dzung, P. D., Phu, D. Van, Du, B. D., Ngoc, L. S., & Duy, N. N. (2017). Effect of foliar application of oligochitosan with different molecular weight on growth promotion and fruit yield enhancement of chili plant. *Plant Production Science*, 1008, 1–7. <https://doi.org/10.1080/1343943X.2017.1399803>
- Eka, C., Massora, Khikmah, & As'ad, S. A. (2018). *Optimalisasi Produksi Enzim Kitinase Pada Isolat Jamur Kitinolitik Dari Sampel Tanah Rizosfer*. 3(1), 62–69.
- El Ghouth, A., Joseph, A., Jean, G., & Alain, A. (1992). Effect of Chitosan and Other Polyions on Chitin deacetylase in *Rhizopus solonifer*. *Journal Experimental Mycology*, 16(3), 173–177.
- Erizal, E., Abbas, B., Sudirman, S., Deswita, D., & Budiarto, E. (2012). Pengaruh Iradiasi Gamma pada Sifat Fisik dan Mekanik Film Kitosan. *Jurnal Kimia Dan*

*Kemasan*, 34(1), 192–198.

- Gandjar, I. (2006). *Mikologi Dasar dan Terapan*. Yayasan Obor Indonesia.
- Gao, J., Zybaïlov, B., Byrd, A., Griffin, W., Chib, S., MAckintosh, S., Tackett, A., & Raney, K. (2015). Yeast Transcription co-activator Sub 1 and its human Homolog PC4 Preferentially bind to G-quadruplex DNA. *Chemistry Community*, 51(33), 7242–7244.
- García-Fraile, P., Menéndez, E., & Rivas, R. (2015). Role of bacterial biofertilizers in agriculture and forestry. *AIMS Bioengineering*, 2(3), 183–205. <https://doi.org/10.3934/bioeng.2015.3.183>
- Garcia, A., Paz, N. D., & Castro, C. (2015). Effect of molecular weight reduction by gamma irradiation on the antioxidant capacity of chitosan from lobster shells. *Journal of Radiation Research and Applied Sciences*, 8(2), 190–200.
- Gu, X., Xie, ., Li, N., Zheng, Y., & Qin, L. (2012). In vitro and in vivo studies on a Mg-Sr binary alloy system developed as a new kind of biodegradable metal. *Acta Biomaterialia*, 8(6), 2360–2374.
- Gupta, G., Parihar, S., Ahirwar, N., Snehi, S., & Singh, V. (2015). Plant growth promoting rhizobacteria (PGPR): current and future prospects for development of sustainable agriculture. *Journal OfmicroBial and Biochemical Technology*, 7, 2.
- Gupta, V., Bochow, H., Dolej, I., & Fischer. (1999). *Plant Growth Promoting Bacillus subtilis Strain As Potential Inducer of Systemic Resistance in Tomato Against Fusarium wilt*. Institute for Phytopathologi and Plant Protection.
- Haliza, W., & Suharto, M. . (2012). Karakteristik Kitinase dari Mikrobial. *Buletin Teknologi Pascapanen Pertanian*, 8(1).
- Herdyastuti, N., Raharjo, T. J., Mudasir, M., & Matsjeh, S. (2010). Chitinase and Chitinolytic Microorganism : Isolation, Characterization and Potential. *Indonesian Journal of Chemistry*, 9(1), 37–47. <https://doi.org/10.22146/ijc.21580>
- Herman, G. (1998). *Trichoderma sp.* Universitas Riau Press.
- Huda, M. (2010). Pengendalian Layu *Fussarium* pada Tanaman Pisang (*musa paradisiaca L.*) secara Kultur Teknis dan Hayati.[*Skripsi*]. Institut Pertanian Bogor.
- Jamilah, R. (2011). Potensi *Trichoderma harzianum* (T38) dan *Trichoderma pseudokoningii* (T39) sebagai antagonis terhadap *Ganoderma sp.* penyebab penyakit akar pada pohon sengon (*Paraserianthes falcataria* (L) Nielsen.). [*Skripsi*].Institut Pertanian Bogor.
- Karthik, N., Akanksha, K., Binod, P., & Pandey, A. (2014). Production, purification

- and properties of fungal chitinase. *A Review. Indian Journal Experimental Biology*, 52, 1025–1035.
- Kristiana, R. (2004). Integrasi pengendalian penyakit layu *Fusarium* pada bawang merah (*Allium cepa* var. *ascalonicum*) dengan *Binucleate rhizoctonia*, dolomite dan kalium fosfat.[*Skripsi*]. Universitas Sebelas Maret.
- Liu, N., Chen, X., Park, H., Liu, C., Liu, C., & Meng, C. (2006). Effect of MW and concentration of chitosan on antibacterial activity of *Escherichia coli*. *Carbohydrate Polymers*, 64, 60–65.
- Logan, N. A., Old, D. C., & Dick, H. M. (1985). *Letters to the Editor*. 838–839.
- Lowry, O., Rosenbrough, N., Farr, A., & Randall, R. (1951). Protein Measurement with the folin phenol reagent. *Journal Biological Chemistry*, 193, 169–175.
- Mahanty, T., Bhattacharjee, S., Goswami, M., Bhattacharyya, P., Das, B., Ghosh, A., & Tribedi, P. (2017). Biofertilizers: a potential approach for sustainable agriculture development. *Environmental Science and Pollution Research*, 24(4), 3315–3335. <https://doi.org/10.1007/s11356-016-8104-0>
- Malusá, E., & Vassilev, N. (2014). A contribution to set a legal framework for biofertilizers. *Application of Microbiology and Biotechnology*, 98(15), 6599–6607. <https://doi.org/10.1007/s00253-014-5828-y>
- Marita, E., Siti, K., & Ria, L. (2013). Bakteri Pelarut Fosfat Hasil Isolasi dari Tiga Jenis Tanah Rhizofer Tanaman pisang Nipah (*Mus paradisiaca* var. *nipah*) di Kota Singkawang. *Journal Protobiont*, 2(2), 93–101.
- Mazid, M., & Khan, T. . (2015). Future of bio-fertilizers in Indian agriculture: an overview. *International Journal of Agricultural and Food Research*, 3(3), 10–23.
- Mukti, M., & Herdyastuti, N. (2016). Karakterisasi N-asetilglukosamin Hasil Hidrolisis Kitin secara Kimiawi. In *Prosiding Seminar Nasional dan Pembelajarannya*.
- Narandelger, T., Delgermaa, B., Odonchomeg, B., Baigalmaa, J., & Sunjidmaa, O. (2015). Study of plant pathogen suppression the synergistic effect between biofertilizer and irradiated oligochitosan of tomato. *Mongolian Journal of Agricultural Sciences*, 15(2), 80–85. <https://doi.org/10.5564/mjas.v15i2.551>
- Narasimhan, A., Suresh, S., Bist, D., & Shivakumar, S. (2013). Enhancement of Mycolytic Activity of an Antagonistic *Bacillus subtilis* Through Ethyl Methane Sulfonate (EMS) Mutagenesis. *Turkey Journal Biology*, 37, 323–328.
- Nautiyal, C. S. (1999). An efficient microbiological growth medium for screening phosphate solubilizing microorganisms. *FEMS Microbiology Letters*, 170(1), 265–270. [https://doi.org/10.1016/S0378-1097\(98\)00555-2](https://doi.org/10.1016/S0378-1097(98)00555-2)

- Nguyen, H., Quyen, D., Nguyen, S. L., & Vu, V. (2015). An Extracellular Antifungal Chitinase from *Lecanicillium lecanii*: purification, Properties, and Application in Biocontrol Against Plant Pathogenic Fungi. *Turkey Journal of Biology*, 39, 6–14.
- Nurbailis, Mardinus, Nasir, N., Dharma, A., & Habazar, T. (2016). The chitinase activity in banana seedling that induced by *Trichoderma* spp. As resistance response to *Fusarium Oxyporum* f.sp.cubense. *International Journal on Advanced Science, Engineering and Information Technology*, 6(3), 356–360. <https://doi.org/10.18517/ijaseit.6.3.675>
- Nurhayati, H. (2001). Pengaruh pemberian *Trichoderma* spp. Terhadap Daya infeksi dan Ketahanan Hidup *Sclerotium roflsii* pada akar Bibit Cabai.[*Skripsi*]. UNTAD Palu.
- Nuryanthi, N., Syahputra, A., Panerteni, D., Susilawati, S., Puspitasari, T., & Darwis, D. (2018). Sintesis Kitosan Berat Molekul Remdah Menggunakan Hidrogen Peroksida dan Iradiasi Sinar Gamma. *Prosiding Seminar Nasional APISORA*, 109–113.
- Pelczar, Michael, J., & Chan, E. (2008). *Dasar-dasar Mikrobiologi Jilid I* (Jilid 1). UI Press.
- Prabowo, Prihatiningsih, N., Soesanto, & Loekas. (2006). Potensi *Trichoderma harzianum* dalam mengendalikan sembilan isolat *Fusarium oxysporum* Schlecht. f.sp. *Zingiberi trujillo* pada kencur. *Jurnal Ilmu-Ilmu Pertanian Indonesia*, 8, 76–84.
- Purkan, P., Baktir, A., & Sayyidah, A. R. (2016). Produksi Enzim Kitinase Dari *Aspergillus niger* Menggunakan Limbah Cangkang Rajungan Sebagai Induser. *Jurnal Kimia Riset*, 1(1), 34. <https://doi.org/10.20473/jkr.v1i1.2440>
- Rachman, I. ., Djuniawati, S., & Idris, K. (2008). Pengaruh Bahan Organik dan Pupuk NPK terhadap Serapan Hara dan Produksi Jagung di Inceptisolternate. *Jurnal Tanah Dan Lingkungan*, 10, 7–13.
- Rafi, M. M., Krishnaveni, M. S., & Charyulu, P. B. B. N. (2019). Phosphate-Solubilizing Microorganisms and Their Emerging Role in Sustainable Agriculture. In *Recent Developments in Applied Microbiology and Biochemistry*. Elsevier Inc. <https://doi.org/10.1016/b978-0-12-816328-3.00017-9>
- Rahmawati, H., Purnomo, A., Umniyatie, S., Pramiadi, D., & Sari, N. (2016). Identification and characterization of chitinase enzyme producing bacteria from bat guano and its potential to inhibit the growth of fungus *Colletotrichum* sp. cause anthracnose on the chili by in vitro. *International Journal the Advantages of Agricultural & Environmental Engineering*, 3, 249–254. <https://doi.org/Doi: 10.15242/IJAAEE>

- Raymond, J., JL, S., & CR, S. (2004). The natural history of nitrogen fixation. *Molecular Biology*, 21, 541–554.
- Reddy, B. (2013). Soil Health: Issues and Concerns. *A Review Working Paper*. No. 131.
- Reissig, J. L., J.L. Strominger, & Leloir., L. F. (1955). A Modified Colorimetric Method for the Estimation of N-Acetylamino Sugars. *The Journal of Biological Chemistry*., 217, 959–966.
- Rohana, I. (1998). Efektifitas Penggunaan *Trichoderma harzianum* dan Fungisida Mankozeb untuk Pengendalian *Rhizoctonia solani* Penyebab Penyakit Lodoh pada *Acacia mangium*. [ Skripsi] .IPB.
- Saima, M., & Ahmad, R. I. (2013). Isolation of Novel Chitinolytic Bacteria and Production Optimization of Extracellular Chitinase. *Journal of Genetic Engineering and Biotechnology*, 11, 39–46.
- Sari, B. W., Isnaini, N. B., Puspita, I. D., & Husni, A. (2011). *Pembentukan N-Asetilglukosamin dari Kitin Cangkang Udang oleh Serratia marcescens PT-6 yang d ikultur pada b erbagai pH dan Suhu Bioformation of N-Acetylglucosamine from Shrimp Shell Chitin by Serratia marcescens PT-6 Cultured in v arious pH and Temperatu*. 19, 53–59.
- Savci, S. (2012). *An Agricultural Pollutant : Chemical Fertilizer*. 3(1), 11–14.
- Semangun, H. (2000). *Penyakit-Penyakit Tanaman Perkebunan Indonesia*. Universitas Gajah Mada Press.
- Shin, O., Naoto, S., Tetsuya, Y., Kazuo, I., Katsuhiko, K., Salem, D., María, D. A., Ramírez, Kun, Y., Motoki, K., Naoko, O.-O., Yuu, H., Kenshiro, O., Masahira Hattori, F., & A, T. Y. (2019). *crossm Complete Genome Sequence of Plant Growth-Promoting*. April, 23–24.
- Shin, Y., Yoo, D., & Jang, J. (2001). Molecular weight Effect on antimicrobial activity of chitosan-treated cotton fabrics. *Journal Applied Polymer Science*, 80, 2495–2501.
- Sinulingga, N., & Eddy, S. (1989). *Pengendalian Fungi Akar Putih pada Tanaman Karet*. Pusat Penelitian Perkebunan Sungai Putih.
- Somasegaran, P., & Hober, H. J. (1985). *Methods in Legume Rhizobium Technology*. University of Hawaii.
- Subba Rao N. S. (1977). In: *Soil Microorganisms and Plant Growth*, Oxford & IBH Publishing Co., New Delhi, Pages 254-255
- Sudhakar, P., & Nagarajan, P. (2011). Process Optimization for Chitinase Production by *Trichoderma harzianum*. *Asean. Journal of Food Agriculture-Indonesia*, 4(20), 91–102.

- Sugita, P., Sjahtiza, T. W., & Wahyono, D. (2009). *Kitosan Sumber Biomaterial Masa Depan*. IPB Press.
- Sulistiyani. (2017). Optimasi Pengukuran Spektrum vibrasi Sampel Protein Menggunakan Spektrofotometer Fourier Transform Infra Red (FTIR). *Indonesian Journal of Chemical Science*, 6(2), 173–180.
- Suriani, A., & Muis. (2016). Prospek *Bacillus subtilis* sebagai agen pengendalian hayati pathogen tular tanah pada tanaman jagung. *Jurnal Litbang Pertanian*, 35(1), 37–45.
- Suryadi, Y., Priyatno, T. P., Susilowati, D. N., Samudra, I. M., Yudhistira, N., & Purwakusumah, E. D. (2013). Isolasi dan Karakterisasi Kitinase asal *Bacillus cereus* 11 UJ. *Jurnal Biologi Indonesia*, 9(1), 51–62.
- Tandion, H. (2008). Pengaruh Fungi Antagonis *Trichoderma harzianum* dan Pupuk Organik untuk Mengendalikan Patogen Tular Tanah *Sclerothium roflsii Sacc* pada Tanaman Kedelai (*Glycine Max L*) di rumah Kaca. [Skripsi]. Universitas Sumatera Utara.
- Widawati, S., & Suliasih. (2006). Augmentasi Bakteri Perut Fosfat (BPF) Potensial sebagai Pemacu Pertumbuhan Cysin (*Brasica caventis Oed.*) di Tanah Marginal. *Journal Biodiversitas*, 7(1), 10–14. <https://doi.org/10.13057/biodiv/d070104>
- Wijaya, S. (2002). *Isolasi Kitinase dari Sleroderma columnare dan Trichoderma harzianum*. Universitas Negeri Jakarta.
- Wolff, A., Singleton, P., Sidirelli, M., & Bohlool, B. (1993). Influence of acid soil on nodulation and interstrain competitiveness in relation to tannin concentrations in seeds and roots of *Phaseolus vulgaris*. *Soil Biology and Biochemistry*, 25(715), 21.
- Wu, ML., YC. Chuang, JP. Chen, CS. Chen, & MC. Chang. 2001. Identification & Characterization of the Three Chitin-Binding Domains within the Multidomain Chitinase Chi92 from *Aeromonas hydrophila* jp 101. *Journal of Applicaton Environmental Microbiology*. 67: 5100-5106.
- Xu, J. G., Zhao, X. M., Han, X. W., & Du, T. G. (2007). Antifungal activity of oligochitosan against *Phytophthora capsici* and other plant pathogenic fungi in vitro. *Pesticide Biochemistry and Physiology*, 87, 220–228.
- Yanai, K., Takaya, N., Kojima, N., Horiouchi, H., Okta, A., & Takagi, M. (1992). Purification of two chitinases from *Rhizopus oligosporus* and isolation and sequensing of the encoding genes. *Journal of Bacteriology*, 57(22), 7398–7406.
- Yuliawati. (2002). *Pengaruh zeolit, vermikompos, inokulan endomikoriza dan Gliocladium sp. pada pertumbuhan tomat (Lycopersicon esculentum Mill.)*. Institut Pertanian Bogor.

Yurnaliza. (2007). *Senyawa Kitin dan Kajian Aktivitas Enzim Mikrobial Pendegradasinya*. IPB Bogor.

