

DAFTAR PUSTAKA

- [BPS] Badan Pusat Statistik. 2021. *Provinsi Sumatera Barat dalam Angka*. Sumatera Barat: Badan Pusat Statistik. 971 hal.
- Agrios, G.N. 2005. *Plant Pathology, Fifth Edition*. USA: Elsevier Academic Press. 922 p.
- Alexopoulos, C.J. and C.W. Mims. 1996. *Introductory Mycology*. New York: John Wiley & Sons Inc. 664 p.
- Anggraini, F., A. Suryanto dan N. Aini. 2013. Sistem Tanam dan Umur Bibit pada Tanaman Padi Sawah (*Oryza sativa* L.) Varietas Inpari 13. *Jurnal Produksi Tanaman* 1(2): 52-60.
- Ayed, A., L.K. Gramic., I.B. Slimenea., M. Chaouachia., H. Mankaia., I. Karkoucha., N. Djebalia., S. Elkahouia., O. Tabbenea and F. Limama. 2020. Antifungal activity of volatile organic compounds from *Streptomyces* sp. strain S97 against *Botrytis cinerea*. *Biocontrol Science Technology* 31(12): 1330-1348.
- Barka, E.A., P. Vatsa., L. Sanchez., N.G. Vaillant., C. Jacquard. H.P. Klenk., C. Clément., Y. Ouhdouch and G.P.V. Wezel. 2016. Taxonomy, Physiology, and Natural Products of Actinobacteria. *Microbiology and Molecular Biology Reviews* 80(1): 1-43.
- Berdy, J. 2005. Bioactive microbial metabolites. *Journal of Antibiotics* 58(1): 1-26.
- Boukaew, S., A. Plubrukam and P. Prasertsan. 2022. Effect of volatile substances from *Streptomyces philanthi* RM-1-138 on growth of *Rhizoctonia solani* on rice leaf. *BioControl* 58(4): 471-484.
- Brito, M.V.B., W.L. Fonseca., J. Mafezoli., F.G. Barbosa., F.M. Nunes., M.C. Mattos., J.E.A. Santos., F.S.A. Araujo., R.F.B.S. Vieira., H.C.R. Magalhaes., C.R. Muniz., D.B. Garruti., M.A. Ootani., J.M.S. Netto., L. Pinto., F.M.P Viana and M.C.F. Oliveira. 2022. Biologically Active Volatile Organic Compounds (VOCs) Produced by Rhizospheric Actinobacteria Strains Inhibit the Growth of the Phytopathogen *Colletotrichum musae*. *J. Braz. Chem. Soc.* 33(10): 1172-1189.
- Choudoir, M., S. Rosabbi., M. Gebert., D. Helmig and N. Fierer. 2019. A Phylogenetic and Functional Perspective on Volatile Organic Compound Production by Actinobacteria. *mSystems* 4(2): 1-15.
- Chukwuneme, C.F., O.O. Babalola., F.P. Kutu., O.B. Ojuederie. 2020. Characterization of Actinomycetes Isolates for Plant Growth Promoting

Traits and Their Effects on Drought Tolerance in Maize. *Journal of Plant Interactions* 15(1) : 93-105.

- Cordovez, V., V.J. Carrion., D.W. Etalo., R. Mumm. H. Zhu., G.P.V. Wezel and J.M. Raaijmakers. 2014. Diversity and functions of volatile organic compounds produced by *Streptomyces* from a disease-suppressive soil. *Frontiers in Microbiology* 6: 1-13.
- Dennis, C and J. Webster. 1971. Antagonistic Properties of Species Groups of Trichoderma. II. Production of Volatile Antibiotics. *Trans. Br. Mycol. Soc* 57(1): 25-39.
- Dhanasekaran, D and Y. Jiang. 2016. *Actinobacteria Basic and Biotechnical Applications*. London: InTechOpen, 398 p.
- Diaz, M., A.B. Cabrera., A. Trapero., R.M. Marrero., S.S. Rodriguez., R.D.C. Santana., M.G. Bernal and C.A. Brisach. 2022. Characterization of Actinobacterial Strains as Potential Biocontrol Agents against *Macrophomina phaseolina* and *Rhizoctonia solani*, the Main Soil-Borne Pathogens of *Phaseolus vulgaris* in Cuba. *Plants* 11(5): 1-22.
- Djebaili, R., M. Pellegrini., M. Bernardi., M. Smati., M. Kitouni and M.D. Gallo. 2020. Biocontrol Activity of Actinomycetes Strains against Fungal and Bacterial Pathogens of *Solanum lycopersicum* L. and *Daucus carota* L.: In Vitro and In Planta Antagonistic Activity. *Biology and life sciences forum* 4(27): 1-6.
- Elazegui, F. and Z. Islam. 2003. Diagnosis of Common Diseases of Rice. College Los Banos: Internasional Rice Research Institute.
- Etebu, E and I. Ariekpar. 2016. Antibiotics: Classification and Mechanisms of Action with Emphasis on Molecular Perspectives. *International Journal of Applied Microbiology and Biotechnology Research* 4: 90-101.
- Fatmawati, U., Y. Lestari., A. Meryandini., A.A. Nawangsih and A.T. Wahyudi. 2018. Isolation of Actinomycetes from Maize Rhizosphere from Kupang, East Nusa Tenggara Province, and Evaluation of Their Antibacterial, Antifungal, and Extracellular Enzyme Activity. *Indonesian Journal of Biotechnology* 23(1): 40-47.
- Garzia, L., Y. Akagi., K. Takao., C.S. Kim., N. Maekawa., A. Itai., E. Peralta., E. Santos and M. Kodama. 2006. Biology and Systematics of The from Genus *Rhizoctonia*. *Span J Agric Res* 4(1): 55-79.
- Gopalakrishnan, S., S. Pande., M. Sharma., P. Humayun., B. K. Kiran., D. Sandeep., M. S. Vidya., K. Deepthi and O. Rupela. 2011. Evaluation of Actinomycete Isolates Obtained from Herbal Vermicompost for The Biological Control of *Fusarium Wilt* of Chickpea. *Crop Protection* 30: 1070-1078.

- Groenhagen, U., A.L.L.D. Oliveira., E. Fielding., B.S. Moore and S. Schulz. 2016. Coupled Biosynthesis of Volatiles and Salinosporamide A in *Salinispora tropica*. *ChemBioChem* 17(20): 1978-1985.
- Guo, Q., A Kamio., B.S. Sharma., Y. Sagara., M. Arakawa and K. Inagaki. 2006. Survival and subsequent of rice sclerotial diseases fungi, *Rhizoctonia oryzae* and *Rhizoctonia oryzae-sativae*, in paddy fields. *Plant Disease* 90: 615-622.
- Harahap, I.S. dan B. Tjahyono. 1999. *Pengendalian Hama Penyakit Padi*. Jakarta: Penebar Swadaya. 114 hal.
- Harvey, M.E.L., R. Brzezinski and C. Beaulieu. 2018. Chitinolytic Functions in Actinobacteria: Ecology, Enzymes, and Evolution. *Applied Microbiology and Biotechnology* 102(17): 7219-7230.
- Hasani, A., A. Kariminik and S. Issazadeh. 2014. Streptomycetes: Characteristics and Their Antimicrobial Activities. *International Journal of Advanced Biological and Biomedical Research* 2(1): 63-75.
- Hayakawa, M., L. Terekhova and T. Okazaki. 2003. *Selective Isolation of Rare Actinomycetes*. Australia: University of the Sunshine Coast, Faculty of Science. 128 p.
- Kanchiswamy, C.N., M. Malnoy and M.E. Maffei. 2015. Bioprospecting bacterial and fungal volatiles for sustainable agriculture. *Trends in Plant Science* 20(4): 206-211.
- Kanini, G.S., A. Katsifas., A.L. Savvides and A.D. Karagouni. 2013. *Streptomyces rochei* ACTA1551, an Indigenous Greek Isolate Studied as a Potential Biocontrol Agent against *Fusarium oxysporum* f.sp. *lycopersici*. *BioMed Research International* 2013: 1-11.
- Klement, Z., K. Rudolph and D.C. Sand. 1990. *Methods in Phytobacteriology*. Budapest: Academia Kiado.
- Li, X., B. Li., S. Cai., Y. Zhang., M. Xu., C. Zhang., B. Yuan., K. Xing and S. Qin. 2020. Identification of Rhizospheric Actinomycete *Streptomyces lavendulae* SPS-33 and The Inhibitory Effect of its Volatile Organic Comounds againts *Ceratocystis fimbriata* in Postharvest Sweet Potato (*Ipomoea batatas* (L.) Lam.). *Microorganisms* 8(3): 1-13.
- Li, Y., F. He., H. Lai and Q. Xue. 2017. Mechanism of In Vitro Antagonism of Phytopathogenic *Sclerotium rolfsii* by Actinomycetes. *Eur J Plant Pathology* 149(2): 299-311.
- Marwanti, 2022. Mengapa Disparitas Produksi Padi Nasional Sangat Tinggi. Kementerian Pertanian Direktorat Jenderal Tanaman Pangan.

<https://tanamanpangan.pertanian.go.id/detilkonten/iptek/52#:~:text=Hasil%20Penelitian%20Badan%20Penelitian%20dan,54%2C42%20ton%2Fhektar>. [Diakses pada 7 November 2022].

- Mercier, J. and D.C. Manker. 2005. Biocontrol of soil-borne diseases and plant growth enhancement in greenhouse soilless mix by the volatile-producing fungus *Muscodor albus*. *Crop Protection* 24(4): 355-362.
- Morath, S.U., R. Hung and J.W. Bennett. 2012. Fungal volatile organic compounds: A review with emphasis on their biotechnological potential. *Fungal Biology Reviews* 26(2): 73-83.
- Mutmainnah. 2013. Isolasi Actinomycetes dari Tanah Pembuangan Limbah Pabrik Gula Tebu (Camming) Bone Sebagai Penghasil Antibiotika. [Skripsi]. Makassar. Program Studi Farmasi Fakultas Farmasi Universitas Hasanuddin. 62 hal.
- Nurjasmi, R dan Suryani. 2017. Uji Antagonistik Actinomycetes Asal Limbah Kulit Bawang Merah terhadap Patogen Tanaman. *Jurnal Ilmiah Respati Pertanian* 11(2): 718-722.
- Nurjasmi, R dan Suryani. 2018. Uji Daya Hambat Filtrat Zat Metabolit Actinomycetes Asal Hutan Pinus Gunung Bunder Bogor terhadap Pertumbuhan *Curvulria* sp. Secara *In Vitro*. *Jurnal Ilmiah Respati* 9(2): 15-18.
- Nurjasmi, R., Suryani dan Carta. 2019. Penghambatan Actinomycetes Asal Limbah Kulit Bawang Merah terhadap *Sclerotium rolfsii* Secara *In Vitro*. *Jurnal Ilmiah Respati* 10(1): 14-20.
- Nuryanto, B. 2017. Penyakit Hawar Pelepah (*Rhizoctonia solani*) pada Padi dan Taktik Pengelolannya. *Jurnal Perlindungan Tanaman Indonesia* 20(2): 63-71.
- Oskay, M., O.U. Tamer and C. Azeri. 2004. Antibacterial activity of some actinomycetes isolated from farming soils of Turkey. *African Journal Of Biotechnology* 3(9): 441-446.
- Ou, S.H. 1985. *Rice diseases*. Kew : Commonwealth Mycological Institute. 380 p.
- Oyetunde, O.O.A and C.A. Bradley. 2018. *Rhizoctonia solani*: taxonomy, population biology and management of rhizoctonia seedling disease of soybean. *Plant Pathology* 87: 3-17.
- Parmeter, J.R. 1970. *Rhizoctoni Solani, Biology and Pathology American Phytopathological Society Symposium on Rhizoctonia solant held at the Miami meeting of the Society*. Los Angeles and London: University of California Press Berkeley.

- Purnomo, E. Mukarlina dan Rahmawati. 2017. Uji Antagonis Bakteri *Streptomyces* spp. terhadap Jamur *Phytophthora palmivora* BBK01 Penyebab Busuk Buah pada Tanaman Kakao. *Protobiont* 6(3): 1-7.
- Rahma, H., Martinius., J. Trisno., S.D. Shafira dan N. Habsah. 2022. Karakterisasi Aktinobakteri Sebagai Agens Biokontrol Terhadap *Xanthomonas oryzae* pv. *oryzae* Penyebab Penyakit Hawar Daun Bakteri Pada Tanaman Padi. Laporan Penelitian. Dana PNP Fakultas PERTANIAN Universitas Andalas Sesuai dengan Kontrak Penelitian Nomor: 06/PL/SPK/PNP/FAPERTA-Unand/2022. Tahun Anggaran 2022.
- Rahmiyati, M., S. Hartanto dan N.W.H. Sulastiningsih. 2021. Pengaruh Aplikasi Actinomycetes terhadap *Fusarium oxysporum* Schlecht. F.sp. *cepae* (Hanz.) Synd. et Hans. Penyebab Penyakit Layu pada Bawang Merah (*Allium ascalonicum* L. var. *Mentes*). *Jurnal Ilmiah Biologi* 9(1): 248-260.
- Rosmaladewi, O., M.M. Tandi and M. Kulsum. 2020. The Effect of Chitosan in Suppresing the Development of the Sheath Blight Disease (*Rhizoctonia solani* Kuhn) on Rice (*Oryza sativa* L.). *J. Cropsaver* 3(1): 8-16.
- Rustam., Giyanto., S. Wiyono., D.A. Santosa dan S. Susanto. 2011. Seleksi dan identifikasi bakteri antagonis sebagai agens pengendali hayati penyakit hawar pelepah padi. *Jurnal peneliti Pertanian Tanaman Pangan* 30(3): 164-171.
- Sapkota, A., A. Thapa., A. Budhathoki., M. Sainju., P. Shershta and S. Aryal. 2020. Isolation, Characterization, and Screening of Antimicrobial-Producing Actinomycetes from Soil Samples. *International Journal of Microbiology* 2020: 1-7.
- Schaad, N.W., J.B. Jones and W. Chun. 2001. *Laboratory Guide for Identification of Plant Pathogenic Bacteria*. USA: The American Phytopatology Society Press. 373 p.
- Scholler, C. E. G., H. Gurtler., R. Pedersen., S. Molin and K. Wilkins. 2002. Volatile Metabolites from Actinomycetes. *Journal of Agricultural and Food Chemistry* 50(9): 2615-2621.
- Sektiono, A.W., S.N. Kajariyah dan S. Djauhari. 2016. Uji Antagonisme Actinomycetes Rhizosfer dan Endofit Akar Tanaman Cabai (*Capsicum frutescens* L.) terhadap Jamur *Colletotrichum capsici* (Syd.) Bult et Bisby. *Jurnal HPT* 4(1): 17-23.
- Semangun, H. 2008. *Penyakit-Penyakit Tanaman Pangan di Indonesia*. 2nd Ed. Yogyakarta: Gadjah Mada University Press. 475 hal.

- Singh, A.K. and H.S. Chhatpar. 2011. Purification, characterization and thermodynamics of antifungal protease from *Streptomyces* sp. A6. *Journal of Basic Microbiology* 51(4): 424–432.
- Soares, A.C.F., C.S. Sousa., M.S. Garrindo., J.O. Perez and N.S. Almeida. 2006. Soil *Streptomyces* with In Vitro Activity Against The Yam Pathogens *Curvularia eragrostides* and *Colletotrichum gloeosporioides*. *Brazilian Journal of Microbiology* 37: 456-461.
- Soesanto, L. 2008. Pengantar Pengendalian Hayati Penyakit Tanaman. Jakarta: PT. Rajawali Grafindo Persada.
- Sreevidya, M., S. Gopalakrishnan., H. Kudupa and R.K. Varshney. 2016. Exploring Plant Growth-promotion Actinomycetes from Vermicompost and Rhizosphere Soil for Yield Enhancement in Chickpea. *Brazilian Journal of Microbiology* 47(1): 85-95.
- Sudarma, I.M. 2010. Seleksi dan Pemanfaatan Actinomycetes sebagai Mikroba Antagonis yang Ramah Lingkungan terhadap *Fusarium oxysporum* f.sp *cubense* secara *In vitro*. *Ecotrophic* 5(2): 104-107.
- Sudha, A. D. Durgadevil., S. Archana., A. Muthukumar., T.S. Raj., S. Nakkeeran., P. Poczai4., O. Nasif., M.J. Ansari and R.Z. Sayyed. 2022. Unraveling the tripartite interaction of volatile compounds of *Streptomyces rochei* with grain mold pathogens infecting sorghum. *Frontiers in Microbiology* 13: 1-15.
- Sumartini, 2011. Penyakit Tular Tanah (*Sclerotium rolfsii* dan *Rhizoctonia solani*) pada Tanaman Kacang-kacangan dan Umbi-umbian Serta Cara Pengendaliannya. *Jurnal Litbang Petanian* 31(1): 27-34.
- Supyani, and H.S. Gutomo. 2014. Hypovirulent Isolats of *Rhizoctonia solani* collected from rice in Karanganyar Regency, Central Java, Indonesia. *ARPN Jurnal of Agricultural and Biological Science* 9(1): 19-23.
- Suriani dan N. Djaenuddin. 2017. Bioekologi Penyakit Hawar Pelepah *Rhizoctonia solani* pada Tanaman Padi. Balai Penelitian Tanaman Serealia. Dalam: Prosiding Seminar Ilmiah dan Pertemuan Tahunan Ke-24; Komisariat Daerah Sulawesi Selatan. 27 Juli 2017. Maros. Balai Penelitian Tanaman Serelia. Hal 91-98.
- Suryanto, D dan E. Munir. 2006. Potensi Pemanfaan Isolat Kitinolitik Lokal Untuk Pengendalian Hayati Jamur. Dalam: Prosiding Seminar Hasil-hasil Penelitian. Medan. Lembaga Penelitian Universitas Sumatera Utara. Hal 15-25.

- Sutariati, G.A.K dan A. Wahab. 2010. Isolasi dan Uji Kemampuan Rizobakteri Indigenos sebagai Agensia Pengendalian Hayati Penyakit pada Tanaman Cabai. *Jurnal Hortikultura* 20(1): 86-95.
- Thampi, A and R.S. Bhai. 2017. Rhizosphere actinobacteria for combating *Phytophthora capsici* and *Sclerotium rolfsii*, the major soil borne pathogens of black pepper (*Piper nigrum* L.). *Biological control* 109: 1-13.
- Ventura, M., C. Canchaya., A. Tauch., G. Chandra., G.F. Fitzgerald., K.F. Chater and D.V. Sinderen. 2007. Genomics of Actinobacteria: Tracing the Evolutionary History of an Ancient Phylum. *Microbiology and Molecular Biology Reviews* 71(3): 495-548.
- Waluyo, L. 2007. *Mikrobiologi Umum*. Malang: Universitas Muhammadiyah Malang Press.
- Wamishe, Y., R. Carwright and F Lee. 2013. Management of rice diseases. In: Hardke, J. T. eds. *Arkansas Rice Production Handbook*. Little Rock, Arkansas, 72204. University of Arkansas Division of Agriculture Cooperative Extension Service 2301 S. University. pp. 126-133.
- Wan, M., G. Li., J. Zhang., D. Jiang and H.C. Huang. 2008. Effect of volatile substances of *Streptomyces platensis* F-1 on control of plant fungal diseases. *Biological control* 46(3): 552-559.
- Wang, C., Z. Wang., X. Qiao., Z. Li., F. Li., M. Chen., Y. Wang., Y. Huang and H. Cui. 2013. Antifungal activity of volatile organic compounds from *Streptomyces alboflavus* TD-1. *FEMS Microbiol Lett* 341(1): 45-51.
- Wang, Q., B. Duan., R. Yang., Y. Zhao and L. Zhang. 2015. Screening and Identification of Chitinolytic Actinomycetes and Study on the Inhibitory Activity Against Turfgrass Root Rot Disease Fungi. *Journal of Biosciences and Medicines* 3: 56-65.
- Weisskopf, L. 2013. The potential of bacterial volatiles for crop protection against phytopathogenic fungi. *FORMATX Microbial pathogens and strategies for combating them: science, technology and education* (A. Mendez-Vilas, Ed.): 1352-1363.
- Widiantini, F., E. Yulia dan A. Kurniawan. 2020. Penghambatan Pertumbuhan *Rhizoctonia oryzae* dan *Cercospora oryzae* oleh Senyawa Volatil yang Dihasilkan Bakteri Endofit Padi. *Jurnal Agrikultura* 31(1): 61-67.
- Wijaya, C. Y. 2015. Chemical And Molecular Taxonomy Actinobacteria Isolate From Jambi, Timor And Lombok. [Thesis]. Yogyakarta. Fakultas Biologi Universitas Gadjah Mada. 16 hal.

- Wijayanti, E., A. A. Nawangsih dan E. T. Tondok. 2021. Penapisan Aktinomiset Rizosfer Tanaman Liliaceae sebagai Agens Pengendali Hayati *Fusarium oxysporum* f. sp. *cepae*. *Jurnal Fitopatologi Indonesia* 17(6): 225-232.
- Xu, T., L. Caoa., J. Zenga., C.M.M. Francob., Y. Yangc., X. Huc., Y. Liua, X. Wanga., Y. Gaoa., Z. Bua., L. Shid., G. Zhoue., Q. Zhouf., X. Liua and Y. Zhua. 2019. The antifungal action mode of the rice endophyte *Streptomyces hygroscopicus* OsiSh-2 as a potential biocontrol agent against the rice blast pathogen. *Pesticide Biochemistry and Physiology* 160: 58–69

