

DAFTAR PUSTAKA

- Adeoye, A. O., & Lateef, A. 2021. Biotechnological Valorization of Cashew Apple Juice for the Production of Citric Acid by a Local Strain of *Aspergillus niger* LCFS 5. *Journal of Genetic Engineering and Biotechnology*, 19(1): 137.
- Al Hakim, M. R., Dahlan, M. F., Wardani, C. K., Widayatno, T. 2021. Optimasi Induser dan Sumber Nutrisi Anorganik untuk Meningkatkan Aktivitas Enzim Lipase dari Strain *Aspergillus niger* pada Substrat Ampas Kelapa. *The 13th University Research Colloquium (URECOL) 2021*.
- Alekseev, K. V., Dubina, M. V., & Komov, V. P. 2015. Metabolic characteristics of citric acid synthesis by the fungus *Aspergillus niger*. *Applied Biochemistry and Microbiology*, 51(9), 857–865.
- Alsanius, B. W., & Wohanka, W. 2019. Root Zone Microbiology of Soilless Cropping Systems. In *Soilless Culture* (pp. 149–194). Elsevier.
- Amalia, I. W., Nurnanda, D., Hendrianie, N., Darmawan, R. 2019. Proses Pembuatan Asam Sitrat dari Molasses dengan Metode Submerged Fermentation. *Jurnal Teknik ITS*, 8(2): 145-149.
- Amedia, I., Wijanarka, Purwantisari, S. 2016. Optimasi Produksi Inulinase oleh Khamir *Pichia manshurica* DUCC Y-015 pada Tepung Umbi Dahlia (*Dahlia variabilis* Willd.) dengan Variasi Konsentrasi K₂HPO₄ dan Waktu Inkubasi. *Bioma*, 18(1): 48-53.
- Angumeenal, A. R., & Venkappayya, D. 2013. An overview of citric acid production. *LWT - Food Science and Technology*, 50(2), 367–370.
- Anyanwu, V. E., & Okerentugba, P. O. (2013). Citric Acid Production by Wild and UV – Treated Strains of *Aspergillus niger* on Two Different Mineral Salt Media. *International Journal of Applied Sciences and Biotechnology*, 1(3), 145–153.
- Apelblat, A. 2014. *Citric Acid*. Cham: Springer.
- Apriyanthi, R. V., Ratnawati, I Gusti A. A., Kawuri, R. 2021. Pengaruh Sinar Ultraviolet Terhadap Pertumbuhan Bakteri *Enterotoxigenic E. coli* (ETEC) Penyebab Penyakit Diare. *Bioma: Jurnal Biologi Makassar*, 6(1): 66-73.
- Ariyadi, T., & Dewi, S. S. 2009. Pengaruh Sinar Ultraviolet Terhadap Pertumbuhan Bakteri *Bacillus* sp. sebagai Bakteri Kontaminan. *Jurnal Kesehatan*, 2(2): 20-25.

- Aynalem, B., Negi, H., Alemu, Y., Sehwat, N., & Kumar, A. 2024. Citric acid: fermentative production using organic wastes as feedstocks. *Physical Sciences Reviews*, 9(9), 3043–3055.
- Bai, H., Zhao, F., Li, M., Qin, L., Yu, H., Lu, L., Zhang, T. 2019. Citric Acid can Force *Staphylococcus aureus* into Viable but Nonculturable State and its Characteristics. *International Journal of Food Microbiology*, 305: 108254.
- Behera, B. C. 2020. Citric Acid from *Aspergillus niger*: a Comprehensive Overview. *Critical Reviews in Microbiology*, 46(6): 727-749.
- Bellaouchi, R., Hasnaoui, I., Idrissi Yahyaoui, M., Bentouhami, N., Hasnaoui, A., Taibi, M., Elbouzidi, A., Salamatullah, A. M., Nafidi, H., Daelbait, M., Bourhia, M., Abouloifa, H., Rokni, Y., Ghabbour, N., Saalaoui, E., & Asehrou, A. 2024. Improving dietary citric acid production by the wild-type *Aspergillus niger* ASP26 strain isolated from date by-product. *Food Science & Nutrition*, 12(6), 4248–4258.
- Boczek, L. A., Rice, E. W., & Johnson, C. H. 2014. TOTAL VIABLE COUNTS | Spread Plate Technique. In *Encyclopedia of Food Microbiology* (pp. 636–637).
- Börekçi, B. S., Kaban, G., & Kaya, M. 2021. Citric Acid Production of Yeasts: An Overview. *The EuroBiotech Journal*, 5(2), 79–91.
- Cairns, T. C., Zheng, X., Zheng, P., Sun, J., & Meyer, V. 2019. Moulding the mould: Understanding and reprogramming filamentous fungal growth and morphogenesis for next generation cell factories. *Biotechnology for Biofuels*, 12, 77.
- da Silva, G. P., Mack, M., & Contiero, J. 2009. Glycerol: A promising and abundant carbon source for industrial microbiology. *Biotechnology Advances*, 27(1), 30–39.
- de Oliveira, P. Z., de Souza Vandenberghe, L. P., Rodrigues, C., de Melo Pereira, G. V., & Soccol, C. R. 2022. Exploring cocoa pod husks as a potential substrate for citric acid production by solid-state fermentation using *Aspergillus niger* mutant strain. *Process Biochemistry*, 113, 107–112.
- Demirci, E., Arentshorst, M., Yilmaz, B., Swinkels, A., Reid, I. D., Visser, J., Tsang, A., & Ram, A. F. J. 2021. Genetic Characterization of Mutations Related to Conidiophore Stalk Length Development in *Aspergillus niger* Laboratory Strain N402. *Frontiers in Genetics*, 12, 1–11.
- Dias, M.E.S., Lopes, J.C., Carneiro, R.B. 2021. Using Compounds Derived from the Glycerol Fermentation as a Carbon Source for Denitrification and Biological Phosphorus Removal. *Water Air Soil Pollut.* 232 (339).

- Duque-Sarango, P., Delgado-Armijos, N., Romero-Martínez, L., Cruz, D., & Pinos-Vélez, V. 2025. Advancing Waterborne Fungal Spore Control: UV-LED Disinfection Efficiency and Post-Treatment Reactivation Analysis. *Water*, 17(7), 922.
- Dutta, A., Sahoo, S., Mishra, R. R., Pradhan, B., Das, A., Behera, B. C. 2019. A comparative study of citric acid production from different agro-industrial wastes by *Aspergillus niger* isolated from mangrove forest soil. *Environmental and Experimental Biology*, 17(3).
- Fadliyani, N., & Atun, S. 2015. Pemanfaatan Gliserol Hasil Samping Pembuatan Biodiesel dari Minyak Jelantah sebagai Bahan Sintesis Gliserol Asetat. *Jurnal Penelitian Saintek*. 20(2): 149-156.
- Ferrero, D., Moscato, E., Spina, F., Cavalluzzi, M. M., Rotondo, N., Oddon, S. B., Gargano, M. L., Venturella, G., Lentini, G., Berteà, C. M., Gasco, L., Varese, G. C. 2024. The Fungal Alternative: Insights on Medicinal Mushrooms-based Protein-rich Biomasses by Submerged Fermentation of Agro-industrial By-products. *Innovative Food Science and Emerging Technologies*, 95: 103721.
- Gong, Z., Chen, J., Jiao, X., Gong, H., Pan, D., Liu, L., Zhang, Y., Wang, K., Wang, M., Cao, H., Tan, T. 2024. Genome-scale metabolic network models for industrial microorganisms metabolic engineering: current advances and future prospects. *Biotechnology Advances*, 72.
- Gupta, P., Sahoo, P.C., Sandipam, S., Gupta, R. P., Kumar, M. 2023. Fermentation of Biodiesel-derived Crude Glycerol to 1,3-propanediol with Bio-wastes as Support Matrices: Polynomial Prediction Model. *Enzyme and Microbial Technology*. 170 (110292).
- Hendricks, K. E., Christman, M. C., & Roberts, P. D. 2017. A Statistical Evaluation of Methods of In-Vitro Growth Assessment for *Phyllosticta citricarpa*: Average Colony Diameter vs. Area. *PLOS ONE*, 12(1), e0170755.
- Hu, W., Li, W., Chen, H., Liu, J., Wang, S., & Chen, J. 2017. Changes in transcript levels of starch hydrolysis genes and raising citric acid production via carbon ion irradiation mutagenesis of *Aspergillus niger*. *PLOS ONE*, 12(6).
- Ikram-ul, H., Ali, S., Qadeer, M. A., & Iqbal, J. 2004. Citric acid production by selected mutants of *Aspergillus niger* from cane molasses. *Bioresource Technology*, 93(2), 125–130.
- Kanti, A., Ilyas, M., & Sudiana, I. M. 2018. Increase of Citric Acid Production by *Aspergillus niger* InaCC F539 in Sorghum's Juice Medium Amended with Methanol. *Jurnal Biologi Indonesia*, 14(2), 155–163.

- Karaffa, L., & Kubicek, C. P. 2019. Citric acid and itaconic acid accumulation: variations of the same story? *Applied Microbiology and Biotechnology*, 103(7), 2889–2902.
- Karlsson, E., Mapelli, V., & Olsson, L. 2017. Adipic acid tolerance screening for potential adipic acid production hosts. *Microbial Cell Factories*, 16(1), 20.
- Khumaira, A., Said, M. A., & Utami, R. W. 2023. Uji angka lempeng total (ALT) dan angka kapang khamir (AKK) simplisia kunyit (*Curcuma domestica*). *Prosiding Seminar Nasional Penelitian Dan Pengabdian Kepada Masyarakat LPPM Universitas 'Aisyiyah Yogyakarta*, 1, 22–2023.
- Khurshid, S., Ashraf, H., Hussain, T., Iqbal, M., Qureshi, H., Anwar, T., Salmen, S. H., & Ansari, M. J. 2024. Enhanced Citric Acid Production through *Aspergillus niger*: Insights from Fermentation Studies Using Sugarcane Molasses. *Life*, 14(6), 756.
- Kim, S., Ha, I., Lee, Y.-Y., Lee, J., & Yun, J. 2025. Development of a High-Performance *Trichoderma* Mutant for Enhanced Cellulase Production Through UV-Induced Random Mutagenesis. *Journal of Fungi*, 11(6), 439.
- Klein, M., Swinnen, S., Thevelein, J. M., & Nevoigt, E. 2017. Glycerol metabolism and transport in yeast and fungi: established knowledge and ambiguities. *Environmental Microbiology*, 19(3), 878–893.
- Książek, E. 2023. Citric Acid: Properties, Microbial Production, and Applications in Industries. *Molecules*, 29(1), 22.
- Kusuma, A. S. W., & Ismanto, R. M. H. 2016. Penggunaan Instrumen High-Performance Liquid Chromatography Sebagai Metode Penentuan Kadar Kapsaisin Pada Bumbu Masak Kemasan 'Bumbu Marinade Ayam Spesial' Merek Sasa. *Jurnal Farmaka*, 14(2), 41–46.
- Latif, A., Ali, H., Khan Niazi, M. B., Jahan, Z., Hassan, N., Ghuman, I. L., Tawab, A., Saqib, A., & Rashid, M. H. 2025. Process evaluation for enhanced production of aflatoxin-free citric acid by food-grade *Aspergillus niger*. *PLOS One*, 20(5).
- Latif, A., Hassan, N., Ali, H., Niazi, M. B. K., Jahan, Z., Ghuman, I. L., Hassan, F., & Saqib, A. 2024. An overview of key industrial product citric acid production by *Aspergillus niger* and its application. *Journal of Industrial Microbiology and Biotechnology*, 52.
- Lotfy, W., Ghanem, K., & Elhelow, E. 2007. Citric acid production by a novel *Aspergillus niger* isolate: I. Mutagenesis and cost reduction studies. *Bioresource Technology*, 98(18), 3464–3469.

- Miller, S., Abbriano, R. M., Herdean, A., Banati, R., Ralph, P. J., & Pernice, M. 2023. Random mutagenesis of *Phaeodactylum tricornutum* using ultraviolet, chemical, and X-ray irradiation demonstrates the need for temporal analysis of phenotype stability. *Scientific Reports*, 13(1), 22385.
- Mattey, M. 1992. The Production of Organic Acids. *Critical Reviews in Biotechnology*, 12(1-2), 87-132.
- Max, B., Salgado, J., Rodriguez, N., Cortes, S., Converti, A., Dominguez, J. 2010. Biotechnological Production of Citric Acid. *Braz. J. Microbiol.* 41(4): 862-875.
- Meng, J., Zhou, P., Zhang, J., Bao, J. 2014. High Titer Citric Acid Fermentation from Corn Stover Hydrolysate by *Aspergillus niger*. *Journal of East China University of Science and Technology*, (6), 681-683.
- Miyazawa, K., Umeyama, T., Hoshino, Y., Abe, K., & Miyazaki, Y. 2022. Quantitative Monitoring of Mycelial Growth of *Aspergillus fumigatus* in Liquid Culture by Optical Density. *Microbiology Spectrum*, 10(1).
- Mourya, S., & Jauhri, K. S. 2000. Production of citric acid from starch-hydrolysate by *Aspergillus niger*. *Microbiological Research*, 155(1), 37-44.
- Muliana, Subagiada, K., Natalisanto, A. I. 2021. Menentukan Tingkat Intensitas Radiasi UV yang diterima Pekerja Pengelasan dengan Titik Area Mata, Siku, dan Betis. *Progressive Physics Journal*, 2(1): 1-7.
- Murningsih, T., & Chairul. 2000. Mengenal HPLC: Peranannya dalam Analisa dan Proses Isolasi Bahan Kimia Alam. *Berita Biologi*, 5(2), 261-272.
- Naimah, S., & Ratnawati, E. 2010. Pemisahan dan Pengambilan Kembali Gliserol dari Hasil Samping Pembuatan Biodiesel Berbahan Baku Kelapa. *Jurnal Kimia dan Kemasan*. 32(2): 62-66.
- Nugroho, H., Sarwono, E., & Rinaldi, A. 2020. Aplikasi Metode Spektrofotometri pada Klasifikasi Gas Karbon Monoksida (CO) dan Uap Bahan Bakar Petrodiesel (C14H30). *Progressive Physics Journal*, 1(1), 1.
- Nurliati, I., Helianty, S., & Dahliaty, A. 2018. Produksi Enzim Lakase Oleh Jamur *Trichoderma asperellum* LBKURCC1 dengan Variasi Penambahan CuSO₄ menggunakan Bioreaktor TRAY Secara Solid State Fermentation (SSF). *Jom FTEKNIK*, 5, 1-6.
- Ovelando, R., Nabilla, M. A., Surest, A. H. 2013. Fermentasi Buah Markisa (*Passiflora*) menjadi Asam Sitrat. *Jurnal Ilmu Teknik Sriwijaya*, 1(1): 1-7.

- Preparation of Routine Media and Reagents Used in Antimicrobial Susceptibility Testing. 2016. In *Clinical Microbiology Procedures Handbook* (pp. 5.20.1.1-5.20.3.10). ASM Press.
- Ratnawati, I. G. A., Putra, I. K., Suryatika, I. B. M., Sutapa, G. N., & Trisnawati, N. L. P. (2023). Pengaruh Sinar Ultraviolet Terhadap Jamur *Aspergillus niger*. *Kappa Journal*, 7(1), 58–62.
- Ritonga, E. R., Manurung, A., & Martgrita, M. M. 2023. Optimization of Citric Acid Production by Utilizing Rice Husk Waste as a Substrate Using Submerged Fermentation. In *Proceedings of the 4th International Conference on Life Sciences and Biotechnology (ICOLIB 2021)* (pp. 88–97).
- Rohr, M., Kubicek, C. P., & Komínek, J. 1996. Citric Acid. In *Biotechnology* (pp. 307–345). Wiley.
- Sabra W., Bommareddy R.R., Maheshwari G., Papanikolaou S., Zeng A.P. 2017. Substrates and oxygen dependent citric acid production by *Yarrowia lipolytica*: insights through transcriptome and fluxome analyses. *Microb Cell Fact*. 8, 16(1): 78.
- Samosir, G., Sariati, M., Sitepu, I., Ritonga, E., Samosir, A., Martgrita, M. 2021. Optimisation of Rice Husks' Lignocellulose Pre-Treatment Methods and Use of Central Composite Design in Citric Acid Fermentation: A Review. *1st Lekantara Annual Conference on Natural Science and Environment (LeNS)*.
- Samson, R. A., Visagie, C. M., Houbaken, J., Hong, S. B., Hubka, V., Klaassen, C. H. W., Perrone, G., Seifert, K. A., Susca, A., Tanney, J. B., Varga, J., Kocsube, S., Szigeti, G., Yaguchi, T., Frisvad, J. C. 2014. Phylogeny, Identification and Nomenclature of the Genus *Aspergillus*. *Studies in Mycology*, 78: 141-173.
- Sasmitaloka, K. S. 2017. Produksi Asam Sitrat Oleh *Aspergillus Niger* Pada Kultivasi Media Cair. *Jurnal Integrasi Proses*, 6(3).
- Schreferl-Kunar, G., Grotz, M., Rähr, M., & Kubicek, C. P. 1989. Increased citric acid production by mutants of *Aspergillus niger* with increased glycolytic capacity. *FEMS Microbiology Letters*, 59(3), 297–300.
- Septiana, E., Sari, M., Rahmawati, S. I., Izzati, F. N., Harmoko, R., Mustopa, A. Z. 2021. Pengaruh Mutagen Ultraviolet dan Etil Metan Sulfonat Terhadap Kadar Penisilin G Pada *Penicillium chrysogenum*. *BIOPROPAL Industri*, 12(1): 33-41.
- Siagian, A. A., Manurung, A., & Martgrita, M. M. 2023. Scale-up of citric acid production by utilizing rice husk waste and purification using ion exchange

- chromatography. *IOP Conference Series: Earth and Environmental Science*, 1187(1).
- Singh, V., Haque, S., Niwas, R., Srivastava, A., Pasupuleti, M., & Tripathi, C. K. M. 2017. Strategies for Fermentation Medium Optimization: An In-Depth Review. *Frontiers in Microbiology*, 7.
- Soccol, C. R., Vandenberghe, L., Rodrigues, C., Pandey, A. 2006. New Perspectives for Citric Acid Production and Application. *Food Tech Biotechnology*, 44(2): 141-149.
- Steiger, M. G., Rassinger, A., Mattanovich, D., Sauer, M. 2019. Engineering of the Citrate Exporter Protein Enables High Citric Acid Production in *Aspergillus niger*. *Metabolic Engineering*. 52: 224-231.
- Subramaniyam, R., & Vimala, R. 2012. Solid State and Submerged Fermentation for The Production of Bioactive Substances: a Comparative Study. *International Journal of Science and Nature*, 3(3): 480-486.
- Sukaryawan, M., & Sari, D. K. 2023. *Buku Ajar Biokimia 2: Metabolisme Berbasis Konstruktivisme 5 Fase Needham*. Palembang: Bening Media Publishing.
- Sulistiyarsi, A., Pujiati, & Ardhi, M. W. (2016). Pengaruh Konsentrasi dan Lama Inkubasi terhadap Kadar Protein Crude Enzim Selulase dari Kapang *Aspergillus niger* Proses Delignifikasi substrat jerami padi dan crude enzim selulase. *Proceeding Biology Education Conference*, 13(1), 781–786.
- Trela-Makowej, A., Olbińska, E., Orzechowska, A., & Szymańska, R. The concept of UV radiation hormesis: Evidence, mechanisms and implications. *Biological Reviews*.
- Tremarin, A., Longhi, D. A., Salomão, B. de C. M., & Aragão, G. M. F. 2015. Modeling the growth of *Byssoschlamys fulva* and *Neosartorya fischeri* on solidified apple juice by measuring colony diameter and ergosterol content. *International Journal of Food Microbiology*, 193, 23–28.
- Vasanthabharathi, V., Sajitha, N., & Jayalakshmi, S. 2013. Citric Acid Production from UV Mutated Estuarine *Aspergillus niger*. 7(3), 89–94.
- Wahdania, I., Asrul, Rosmini. 2016. Uji Daya Hambat *Aspergillus niger* Pada Berbagai Bahan Pembawa Terhadap *Phytophthora palmivora* Penyebab Busuk Buah Kakao (*Theobroma cacao* L.). *Agrotekbis*, 4(5): 521-529.
- Wang, H., Kaur, G., Pensupa, N., Uisan, K., Du, C., Yang, X., Carol, S. 2018. Textile Waste Valorization using Submerged Filamentous Fungal Fermentation. *Process Safety and Environmental Protection*, 118: 143-151.

- Wang, Z., Wang, B., Jin, L., Ruan, H., & Jin, F. 2024. Implications of carbon catabolite repression for *Aspergillus*-based cell factories: A review. *Biotechnology Journal*, 19(2).
- Zhang, L., Jin, H., Jiao, D., Lin, W., Liu, J., & Liu, H. 2025. High-yield bioconversion of glycerol to L-malic acid in *Aspergillus niger* via systematic engineering of glycerol catabolism and minimal glucose supplementation. *Chemical Engineering Journal*. 515: 163687.
- Zheng, X., Du, P., Gao, K., Du, Y., Cairns, T. C., Ni, X., Chen, M., Zhao, W., Ma, X., Yang, H., Zheng, P., & Sun, J. 2023. Genome-wide transcription landscape of citric acid producing *Aspergillus niger* in response to glucose gradient. *Frontiers in Bioengineering and Biotechnology*, 11.
- Zhou, Y., Zhu, Y., & Wong, W. K. 2023. Statistical tests for homogeneity of variance for clinical trials and recommendations. *Contemporary Clinical Trials Communications*, 33, 101119.