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DAFTAR PUSTAKA

Agrios, G. N., 1996, *Ilmu Penyakit Tumbuhan*, Gajah Mada University Press, Yogyakarta.

Ahmad, A., Patta, A. M., & Natsir, H., 2013, Immobilization and Characterization of L–Asparaginase from The Thermophilic Bacteria Bacillus licheniformis Strain HSA3-1a, *International Journal of Pharma and Bio Sciences*, 4.

Ahmed Mervat, M., Nageh, A., Taher, T., Fareed, H., 2015, Production, purification and characterization of L-asparaginase from marine endophytic Aspergillus sp: ALAA-2000 under submerged and solid state fermentation, *Journal Microbiology and Biochemical Technology*, 7(3), 165-172.

Andrade, K.C.R., Fernandez, R.A., Pinho, D.B., de Freitas, M.M., Filho, E.X.F., Pessoa, A., Silva, J.I., & Magalhães, P.O., 2021, Sequencing and characterization of an L-asparaginase gene from a new species of *Penicillium* section *Citrina* isolated from Cerrado, *Scientific Reports*, 11.

Arif, H. M. & Hussain, Z., 2014, Important sources and medicinal applications of L-asparaginase, *International Journal of Pharma Research & Review*, 3(6), 35-45.

Ashok, A., Doriya, K., & Rao, J.V., 2019, Microbes Producing L-Asparaginase free of Glutaminase and Urease isolated from Extreme Locations of Antarctic Soil and Moss, *Scientific Reports,* 9**,** 1423.

Barnes, W. R., Dorn, G. L., & Vela, G. R., 1977, Effect of Culture Conditions on Synthesis of L-Asparaginase by *Escherichia coli* A-1, *Applied and Enviromental Microbiology*, 33(2), 257-261.

Baskar, G., & Renganathan, S., 2011, Screening of supplementary nitrogen source for fungal L-asparaginase production from soyabean meal flour using Latin square design, *International Journal Research of Biotechnology and Biochemistry*, 1, 1–7.

Baldrian, P., 2003., Interactions of heavy metals with white-rot fungi. *Enzyme Microbial Technology*, 32, 78–91.

Bianchini, A., & Stratton, J., 2014, *Encyclopedia of Food Microbiology*, Elsevier Inc., Amsterdam.

Cachumba, J. J. M., Antunes, F. A. F., Peres, G. F. D., Brumano, L. P., Santos, J. C. D., & Da Silva, S. S., 2016, Current applications and different approaches for

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microbial L-asparaginase production, *Biotechnology and Industry Microbiology*, 167, 1-9.

Carlile, M.J., Watkinson, S.C., & Gooday, G.W., 2001, *The Fungi*, 2nd Edition, Academic Press, London.

Cecconello, D.K., Magalhães, M.R., Werlang, I.C.R., Lee, M.L.M., Michalowski, M.B., & Daudt, L.E., 2019, Asparaginase: an old drug with new questions, *Hematology, Transfusion, and Cell Theraphy*, 42(3), 275-282.

Dange, V., & Peshwe, S., 2011, Production, purification andch aracterizationof fungal L-asparaginase**,** *Bionano Frontier*, 4, 162-167.

Departemen Kesehatan RI, 2018, *Inilah 6 Jenis Kanker yang Rentan Terjadi pada Anak* [online], http://www.depkes.go.id/, diakses 30 Juli 2020.

Dias, F.F.G., de Castro, R.J.S., Ohara, A., Nishide, T.G., Bagagli, M.P., & Sato, H.H., 2015, Simplex centroid mixture design to improve L-asparaginase production in solid-state fermentation using agroindustrial wastes, *Biocatalyst Agriculture and Biotechnology*, 4 (4), 528–534.

Ding, J., Jiang, X., Guan, D., Zhao, B., Ma, M., & Zhou, B., 2017, Influence of inorganic fertilizer and organic manure application on fungal communities in a long-term field experiment of Chinese Mollisols. *Applied Soil Ecology,*111, 114–122.

Dhanam, J. G., & Kannan, S., 2014, Screening and characterization of L-asparaginase producing Streptomyces isolated from soil samples of Periyar Lake, Kumilly, *Bioscience Discovery*, 5, 50–54.

Doriya, K., Jose, N., Gowda, M., & Kumar, D. S., 2016, Solid-State Fermentation vs Submerged Fermentation for the Production of L-Asparaginase, *Advances In Food and Nutrition Research*, 78, 115-135.

Dutta, S., Ghosh, S., Pramanik, S., 2015, L-asparaginase and L-glutaminase from Aspergillus fumigatus WL002: Production and some physicochemical properties, *Application of Biochemestry and Microbiology,* 51(4), 425.

Dwidjoseputro, 1998, *Dasar-Dasar Mikrobiologi*, Penerbit Djambatan, Jakarta.

Eisele, N., Linke, D., Bitzer, K., Na'amnieh, S., Nimtz, M., Berger, R.G., 2011, The first characterized asparaginase from a basidiomycete, Flammulina velutipes, *Bioresource Technology*, 102(3), 3316–3321.

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El-Hadi, A. A., El-Refai, H. A., Shafei, M. S., Zaki, R., & Mostafa, H., 2017, Statistical optimization of L-asparaginase production by using *Fusarium solani*, *Egyptian Pharmaceutical Journal*, 16, 16-23.

El-Naggar, N. E., Moawad, H., & Abdelwahed, 2017, Optimization of fermentation conditions for enhancing extracellular production of L-asparaginase, an anti-leukemic agent, by newly isolated *Streptomyces brollosae* NEAE-115 using solid state fermentation, *Annals of Microbiology*, 67, 1-15.

Elshafei, A., & El-Ghonemy, D. H., 2015, Screening and Media Optimization for Enhancing L-asparaginase Production, an Anticancer agent, from Different Filamentous Fungi in Solid State Fermentation, *British Biotechnology Journal*, 9(3), 1-15.

Farag, A.M., Hassan, S. W., Beltagy, E. A., & El-Shenawy, M.A., 2015, Optimization of production of anti-tumor l-asparaginase by free and immobilized marine Aspergillus terreus, *Egyptian Journal of Aquatic Research*, 41(4), 295-302.

Ferrari, R., 2015, Writing narrative style literature reviews, *Medical Writing*, 24 (5).

Figuiredo, L., Cole, P. D., & Dracthman, R. A., 2016, Asparaginase Erwinia crysanthemi as a component of a multi-agent chemotherapeutic regimen for the treatment of patients with acute lymphoblastic leukemia who have developed hypersensitivity to E. coli-derived Asparaginase, *Expert Review of Hematology*.

Frąc, M., Jezierska-Tys, S., & Takashi, Y., 2015, Occurrence, detection, and molecular and metabolic characterization of heat-resistant fungi in soils and plants and their risk to human health. *Advances in Agronomy*. 132, 161–204.

Gao, H., Liu, M., Liu, J., Dai, H., Zhou, X., Liu, X., Zhuo, Y., Zhang, W., & Zhang, L., 2009, Medium optimization for the production of avermectin B1a by *Streptomyces avermitilis* 14-12A using response surface methodology, *Bioresource Technology*, 00, 4012–4016.

Ge, Z. W., Kuan Z., & Zhu L. Y., 2015, Special diversity of *Flamullina* in China: new varieties and a new record, *Mycosystema*, 34(4), 600.

Ghasemi, Y., Ebrahimi, A., Rasoul-Amini, S., Zarrini, G., & Ghoshoon, M. B., 2008, An Optimized Medium for Screening of L-Asparaginase Production by

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Universitas Gadjah Mada, 2021 | Diunduh dari http://etd.repository.ugm.ac.id/

Escherichia coli, *American Journal of Biochemistry an Biotechnology*, 4(4) 422-424.

Gulati, R., Saxena, R., & Gupta, R., 1997, A rapid plate assay for screening L-asparaginase producing microorganism, *Letter in Applied Microbiology*, 24(1), 23-26.

Gupta, N., Dash, S.J., & Basak, U.C., 2009, L-asparaginases from fungi of Bhitarkanika mangrove ecosystem, *Asian Pacific Journal of Molecule Biology and Biotechnology*, 17(1), 27-30,

Gurunathan, B., & Sahadevan, R., 2011, Design of experiments and artificial neural network linked genetic algorithm for modeling and optimization of L-asparaginase production by *Aspergillus terreus* MTCC 1782. Biotechnology anf Bioprocess Engineering, 16(1), 50–58.

Hanrahan, G., & Chan, G., 2005, *Encyclopedia of Analytical Science*, 2nd Edition, Elsevier Inc., Amsterdam.

Hatamzadeh, S., Rahnama, K., Nasrollahnejah, S., Fotouhifar, K. B., Hemmati, K., White, J. F., & Talilei, F., 2020, Isolation and identification of L-asparaginase-producing endophytic fungi from the Asteraceae family plant species from Iran, *PeerJ*, 8.

Ho, D. H., Whitecar, J. P., Jr, Luce J. K., & Frei E., 1970, 3rd L-asparagine requirement and the effect of L-asparaginase on the normal and leukemic human bone marrow, *Cancer Research*, 30, 466–72.

Huang, L., Liu, Y., Sun, Y., Yan, Q., & Jiang, Z., 2014, Biochemical characterization of a novel L-asparaginase with low glutaminase activity from *Rhizomucor miehei* and its application in food safety and leukemia treatment, *Application of Environmental Microbiology*, 80(5), 1561–1569.

ICF International, 2011, *Supplemental Technical Report for Sodium Nitrate* [online], https://www.ams.usda.gov/sites/default/files/media/Sodium%20Nitrate%20TR%202011.pdf, diakses 4 Januari 2022 pukul 01.48 WIB.

Imada, A., Igarasi, S., Nakahama, K., & Isono, M., 1973, Asparaginase and glutaminase activities of microorganisms, *Journal of General Microbiology*, 76(1), 85–99.

UNIVERSITAS
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Universitas Gadjah Mada, 2021 | Diunduh dari http://etd.repository.ugm.ac.id/

Janakiraman, S. & Meghavarnam, A. K, 2015, Optimazion and Physchological Growth Conditions for Maximal Production of L-asparaginase by *Fusarium* Species, *International Journal of Bioassays*, 4(10), 4369-4375.

Kavanagh, K., 2005, *Fungi: Biology and Application*, Wiley, New Jersey.

Keating M.J, Holmes R., Lerner S., & Ho D.H., 1993, L-asparaginase and PEG asparaginase--past, present, and future, *Leukemia & Lymphoma*, 10, 153-157.

Kementerian Kesehatan RI, 2011, *Draft II Pedoman Penemuan Dini Kanker Pada Anak*, Direktorat Jenderal PP & PL, Direktorat Pengendalian Penyakit Tidak Menular, Jakarta.

Kementerian Kesehatan RI, 2013, *Panduan memperingati hari kanker sedunia di Indonesia tahun 2013: Apakah Anda tahu tentang kanker?*, Direktorat Jenderal PP & PL, Jakarta.

Kumar, K., Kataria, M., & Verma, N., 2013, Plantasparaginase-based asparagine biosensor for leukemia, *Artificial Cells, Nanomedicine, and Biotechnology*, 41(3), 184-188.

Kumar, K.N., & Manonmani, H.K., 2013, Purification and kinetic properties of extracellular L-asparaginase produced by *Cladosporium sp.*, *World Journal of Microbiology & Technology*, 29, 577-587.

Lauber, C.L., Strickland, M.S., Bradford, M.A., & Fierer, N., 2008, The influence of soil properties on the structure of bacterial and fungal communities across land-use types, *Soil Biology Biochemistry*, 40, 2407-2415.

Levin, L., Forchiassin, F., & Viale, A., 2005, Ligninolytic enzyme production and dye decolorization by *Trametes trogii*: application of the Plackett–Burman experimental design to evaluate nutritional requirements, *Process Biochemistry*, 40, 1381–1387.

Lincoln, L., & More, S.S., 2014, Isolation and production of clinical and food grade L-asparaginase enzyme from fungi**,** *Journal of Pharmacognosy Phytochemical*, 3(3), 177-183.

Link, H., & Weuster-Botz, D., 2011, Medium Formulation and Development, *Comprehensive Biotechnology*, 2nd Edition, Elsevier Inc., Amsterdam.

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Liu B-L., & Tzeng Y-M, 1998, Optimization of growth medium for the production of spores from *Bacillus thuringiensis* using response surface methodology. *Bioprocess Engineer*, 18, 413–418.

López-Bucio, J., Pelagio-Flores, R., & Herrera-Estrell, A., 2015, *Trichoderma* as biostimulant: exploiting the multilevel properties of a plant beneficial fungus, *Scientie Horticulturae*, 196, 109–123.

McConnaughey, M., 2014, Physical Chemical Properties of Fungi, *Reference Module of in Biomedical Research*.

McGrath, D., Smith, C., & Gholz, H., 2001, Effects of Land-Use Change on Soil Nutrient Dynamics in Amazônia, *Ecosystems*, 4, 625–645.

Michalska, K., & Jaskolski, M., 2006, Structural aspects of L-asparaginases, their friends and relations, *Acta Biochimica Polonia-English Edition*, 53(4), 627.

Mohan Kumar, N.S., Ramasamy, R., & Manonmani, H.K., 2013, Production and optimiza- tion of L-asparaginase from *Cladosporium sp*. using agricultural residues in solid state fermentation, *Indian Crops Production*, 43, 150–158.

Muneer, F., Siddique, M. H., Azeem, F., Rasul, I., Muzammil, S., Zubair, M., Afzal, M., & Nadeem, H., 2020, Microbial L-asparaginase: purification, characterization, and applications, *Archives of Microbiology*.

Murali, T., 2011, L-asparaginase from marine derived fungal endophytes of seaweeds**,** *Mycosphere*, 147-155.

Nagarethinam, S., Nagappa, A. N., Udupa, N., & Rao, V., 2012, Microbial L-Asparaginase and its future prospects, *Asian Journal of Medical Research*, 1(4), 159-68.

Nageswara, S., Guntuku, G., & Tadimalla, P., 2014, Production of L-asparaginase by solid state fermentation using marine fungus**,** *BioMed Research International*, 1-9.

Pandey, A., Soccol, C.R., & Mitchell, D., 2000, New development in solid state fermentation: I-bioprocesses and products, *Process Biochemistry*, 35, 1153-1169.

Panwal, J., Viruthagiri, T., Baskar, G., 2011, Statistical modeling and optimization of enzymatic milk fat splitting by soybean lecithin using response surface methodology. *International Journal of Nutrition and Metabolism*, 3, 50–57.

UNIVERSITAS
GADJAH MADA
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Pieters, R,. Hunger S.P., Boos, J., Rizzari, C., Silverman, L., Baruchel, A., Goekbuget, N., Schrappe, M., Pui, C.H., 2011, L-asparaginase treatment in acute lymphoblastic leukemia: a focus on Erwinia asparaginase, *Cancer*, 117(2), 238-249.

Praveesh, B.V., 2012, Isolation and screening of L-asparaginase producing fungi from soil samples, *International Journal of Pharmacy and Pharmaceutical Sciences*, 4(1), 279-282.

Prihanto, A. A., & Wakayama, M., 2016, Marine Microorganism: An Underexplored Source of l-Asparaginase, *Advances In Food and Nutrition Research*, 79, 1-25.

Puspitasari, O. & Wuryanti, 2010, Isolasi Enzim L-Asparaginase dari Rimpang Temulawak (*Curcumma xanthorriza* Roxb.) dan Uji Potensi terhadap Kultur Sel Leukemia Tipe K562, *Jurnal Kimia Sains dan Aplikasi*, 13(2), 61-65.

Qhesmi, F.I., Homaei, A., Fernandes, P., & Javadpour, S., 2018, Marine microbial L-asparaginase: Biochemistry, molecular approaches and applications in tumor therapy and in food industry, *Microbiological Research*, 2018, 99-112.

Rouphael, Y., Franken, P., Schneider, C., Schwarz, D., Giovannetti, M., & Agnolucci, M., 2015, Arbuscular mycorrhizal fungi act as biostimulants in horticultural crops, *Scientia Horticulturae*, 196, 91–108.

Revankar M.S. & Lele, S., 2006, Increased production of extracellular laccase by the white rot fungus *Coriolus versicolor* MTCC 138, *World Journal of Microbiology and Biotechnology*, 22, 921–926.

Shrivastava, A., Khan, A.A., Khurshid, M., Kalam, M.A, Jain, SK, & Singhal, PK., 2016, Recent developments in L-asparaginase discovery and its potential as anticancer agent, *Critical Reviews in Oncology/Hematology*, 100, 1-10.

Srinivas, C., Uzma, F., & Narashima Murthy, K., 2016, Optimization of physiological conditions for L-asparaginase production by endophytic fungi (*Fusarium solani*) isolated from *Tinospora cordifolia* (Willd.) Hook. F & Thomson**,** *European Journal of Experimental Biology*, 6 (3), 37-45.

Sun, J. M., Irzykowski, W., Jędryczka, M., & Han, F. X., 2005, Analysis of the genetic structure of *Sclerotinia sclerotiorum*(Lib.) de Bary populations from different regions and host plants by Random Amplified Polymorphic DNA markers, *Journal of Integrative Plant Biology*, 47, 385–395.

UNIVERSITAS
GADJAH MADA
NARRATIVE REVIEW: KARAKTERISASI JAMUR PENGHASIL L-ASPARAGINASE SERTA UJI AKTIVITAS METABOLITNYA
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Universitas Gadjah Mada, 2021 | Diunduh dari http://etd.repository.ugm.ac.id/

Speight, J.G., 2017, *Environmental Inorganic Chemistry for Engineers,* Elsevier, Inc., Amsterdam.

Szymanska, K., & Park, S., 2019, Acute Lymphocytic Leukemia: Diagnosis and Treatment, *Encyclopedia of Cancer,* Elsevier Inc., Amsterdam.

Talluri, V. P., Bhavana, M., Kumar, M. M., & Rajagopal, S.V., 2014, L-asparagine: an ultimate anti-neoplastic enzyme, *International Letters of Natural Sciences*, 15, 23-35.

Templier, M., & Pare, G., 2015, A Framework for Guiding and Evaluating Literature Reviews, *Communications of the Association for Information Systems*, 37(6).

Tim Penyusun IONI, 2014, *Informatorium Obat Nasional Indonesia* [online], http://pionas.pom.go.id/, diakses 3 Januari 2022 pukul 11.30 WIB.

Vassileva, M., Malusá, E., Eichler-Löbermann, B., & Vassilev, N., 2020, *Aspegillus terreus*: From Soil to Industry and Back, *Microorganism*, 8(11), 1165.

Verma, N., Kumar, K., Kaur, G., & Anand, S., 2007, L-asparaginase: a promising chemotherapeutic agent, *Critical Reviews In Biotechnology,* 27(1), 45-62.

van der Sluis, I.M., Vrooman, L.M., Pieters, R., Baruchel, A., Escherich, G., Goulden, N., Mondelaers, V., Sanchez de Toledo, J,. Rizzari, C,. Silverman, L.B., & Whitlock JA, 2016, Consensus expert recommendations for identification and management of asparaginase hypersensitivity and silent inactivation, *Haematologica*, 101(3), 279-285.

Wade, H. E., Robinson, H. K., & Phillips, B. W., 1971, Asparaginase and glutaminase activities of bacteria, *Journal of General Microbiology*, 69(3), 299–312.

Wakil, S. M., & Adelegan, A. A., 2015, Screening, production and optimization of L-asparaginase from soil bacteria isolated in Ibadan, South-western Nigeria, *Journal of Basic & Applied Sciences*, 11, 39-51.

Wang, Y.H., Feng, J.T., Zhang, Q., & Zhang, X., 2008, Optimization of fermentation condition for antibiotic production by *Xenorhabdus nematophila* with response surface methodology, *Journal Application Microbiology*, 104, 735–744.

Warangkar S. C., Khobragade C. N., Dawane B. S., & Bhosale R. B., 2009, Effect of dihydropyrimidin derivatives on kinetic parameters of *E. carotovora* L-asparaginase, *International Journal of Biotechnology Applications,* 1(1), 5-13.

UNIVERSITAS
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Universitas Gadjah Mada, 2021 | Diunduh dari http://etd.repository.ugm.ac.id/

Watson, R ., & Preedy, V., 2019, *The Mediterranian Diet*, Elsevier Inc., Amsterdam.

Weber, R.W.S., & Kuhn, A., 2003, Soil-borne Penicillium spp. and other microfungi as efficient degraders of the explosive RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine), *Mycological Progress*, 2(2), 83-93.

WHO, 2015, *19th WHO model list of essential medicines* [online], http://www.who.int/, diakses 8 Agustus 2020 pukul 15.08 WIB.

Yano, S., Minato, R., Thongsanit, J., Tachiki, T., & Wakayama, M., 2008, Overexpression of type I L-aparaginase of *Bacillus subtilis* in *Escherichia coli*, rapid purification and characterisation of recombinant type I L-asparaginase, *Annals of Microbiology*, 58(4), 711-716.

Youcai, Z., & Tao, Z., 2021, *Biohydrogen Production and Hybrid Process Development*, Elsevier, Inc., Amsterdam.

Youssef, M. M., & Al-Omair, M. A., 2008, Cloning, purification, characterization and immobilization of L-asparaginase II from *E. coli* W3110, *Asian Journal of Biochemistry*, 3(6), 337-350.

Žifčáková, L., Vetrovský, T., Howe, A., & Baldrian, P., 2016, Microbial activity in forest soil reflects the changes in ecosystem properties between summer and winter. *Environment Microbiology*, 18, 288–301.