



DAFTAR PUSTAKA

- Abadulla, Elias., Tzanko, T., Silgia, C., Karl-Heinz, R., Artur, C.P., and Georg, M.G., 2000. Decolorization and Detoxification of Textile Dyes with a Laccase from *Trametes hirsuta*. *Applied and Environmental Microbiology*. **66**: 3357-3362.
- Acharya, Tankeshwar. 2013. *Colony Morphology of Bacteria; How to Describe Bacteria Colonies*. <http://microbeonline.com/colony-morphology-bacteria-describe-bacterial-colonies/>. Diakses tanggal 14 Januari 2016.
- Aditya, Desy, F. 2014. Dampak Pengakuan Dunia terhadap Batik Indonesia pada Aspek Produksi di Kelurahan Kergon Kota Pekalongan. *Fashion and Fashion Education Journal*. **1**. 27-33.
- Ajibola, V.O., S.J, Oniye., C.E, Odeh., T.Olugbodi., and U.G.Umeh. 2005. Biodegradation of Indigo Containing Textile Effluent Using Some Strains of Bacteria. *Journal of Applied Sciences*. **5**:853-855.
- Alexandra, Patricia. 2005. *Degradation of Dyes with Micoorganisms Studies with Ascomycetes Yeast*. Thesis to Obtain the PhD Degree in Sciences. University of Minho. Portugal, B., Rathna, S.L., Shiva, K.E., Srinu, A., Roja, R.P., Vijaya, L.D and Durbaka, V.R.P. 2015. Biodecolorization of Anthraquinone Textile (Acid Blue 25) Dye By *Klebsiella* sp. *International Journal of Recent Scientific Research*. **6**: 3216-3222.
- Azad, Abul, K., Hossen, M.D.Z., Kamrul, I., and Mohammad, M.I. 2013. *Biodegradation of Reactive Textile Dyes by Bacterial Isolates*. Bangladesh: Departement of Genetic Engineering and Biotechnology, Shahjajal University of Science and Technology.
- Balan, D.S.L., and Monteiro, R.T.R. 2001. Decolorization of Textile Indigo Dye by Lignolytic Fungi. *Journal of Biotechnology*. **89**: 141-145.
- Bari, Qurratulane., And Nagendra, B. Degradation Potential of *Micrococcus luteus*, *Staphylococcus aureus* and *Serratia marcencens* Against Some Commonly Used Dyes. *International Journal of Enviromental Biology*. **4**: 145-149.
- Barragan, B. E., Carlos, C., and M, Carmen, M. 2007. Biodegradation of azo dyes by bacteria inoculated on solid media. *Dyes and Pigments*. **75**: 73-81.
- Borar, Prateeka., Kushan, C., Neeraja, M., Parijat, D., Sowptikal, P., Arup, K.M., and Sudeshna, S.C. 2015. Isolation and Characterization of *Aeromonas aquariorum* from A Dye Effluent and Its Effect in Bioaugmentation.



IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT). **9**: 10-16.

Campos, R., A. Kandelbauer., K.H. Robra., and Arthur C.P., G.M. Gubitz. 2001a. Indigo Degradation with Purified Laccases from *Trametes hirsuta* and *Sclerotium rolfsii*. *Journal of Biotechnology*. **89**: 131-139.

Campos, R., Cavaco-Paulo, A., and Robra, K.H. 2001b. Indigo Degradation with Laccases from *Polyporus* sp. And *Sclerotium rolfsii*. *Textile Research Journal*. **71**: 420-424.

Chia, Mathias, A. And Rilwan, I.M. 2014. Effect of Indigo Dye Effluent on The Growth, Biomass Production and Phenotypic Plasticity of *Scenedesmus quadricauda* (Chlorococcales). *Annals of the Brazilian Academy of Sciences*. **86**: 419-428.

Durante, D., R. Casadio., L. Martelli., G. Tasco., M. Portaccio., P. De Luca., U. Bencivenga., S. Rossi., S. Di Mirtino., V.Grano., N. Diano., and D.G. Mita. 2004. Isothermal and Non-Isothermal Bioreactors in the Detoxification of Waste Water Polluted by Aromatic Compounds by means of Immobilised Laccase from *Rhus vernicifera*. *Journal of Molecular Catalysis B-Enzymatic*. **27**: 191-206.

Ebency, C.I.L., S, Rajan., and A.G. Murugesan. 2014. Biodegradation of Indigo Blue Dye using The Soil and Sludge Isolate of The Effluent Run Off Site. *World Journal of Pharmacy and Biotechnology*. **1**: 51-55.

Eichlerova, I., Homolka, L., Nerud F. 2006. Synthetic dye decolorization capacity of white rot fungus *Dichomitus squalens*. *Bioresource Technology*. **97**: 2153–2159.

Fischer, G.C., J. Maier., K.H. Robra., and G.M. Geubitz. 2005. *Environmental Chemistry*. Berlin: Springer Berlin Heidelberg..

Franciscon, Elisangela., Andrea, Z., Fabiana, F. G., Isis, S.S., Artur, C.P and Lucia, R.D. 2008. Microaerophilic – aerobic sequential decolourization / biodegradation of textile azo dyes by a facultative *Klebsiella* sp. strain VN-31. *Process Biochemistry*. **44**: 446-452.

Fu, Y., dan Viraraghavan T. 2001. Fungal decolorization of dye wastewater: a review. *Bioresource Technology*. **79**: 251–262.

Gauche, C., Jamie A, H., and David M, L. 2012. *Hair Treatment Methods*. United Kingdom. Perachem Limited.

Genc, N dan E. Can-Dogan. 2006. Photooxidation: A Decolorization Procedure and a Pre-Treatment Step for Biodegradation of Reactive Azo Dye. *Polish Journal of Enviromental Studies*. **15**: 73-79.



- Gill PK., Arora DS., and Chander M. 2001. Biodecolourization of azo and triphenylmethane dyes by *Dichomitus squalens* and *Phelbia* spp. *Journal of Industrial Microbiology & Biotechnology*. **28**: 201–203.
- Godlewska, E. Z., Wioletta, P. And Elzbieta, G. S. 2015. Dye Decolourisation Using Two *Klebsiella* Strains. *Water Air Soil Pollut.* 226: 2249.
- Gondaliya, Nidhi., and Parikh, S. 2012. Decolorization of Reactive Orange 16 by *Serratia marcescens*. *Life Sciences Leaflet*. **11**: 86-96.
- Gowri, R.S., R. Vijayaraghavan., and P. Meenambigai. 2014. Microbial Degradation of Reactive Dyes- A Review. *International Journal of Current Microbiology and Applied Sciences*. **3**: 421-436.
- Gurulaksmi, M., Sudarmani, D. N. P., and Venba, R. 2008. Biodegradation of Leather Acid dye by *Bacillus subtilis*. *Research Article*. 12-18.
- Harit, Jha and Patil, Mandakini. 2013. Biopulping of Sugarcane Bagasse and Decolorization of Kraft Liquor by the Laccase Produced by *Klebsiella aerogenes* NCIM 2098. *Malaysian Journal of Microbiology*. **9**: 301-307.
- Holt, John. G., Noel, R.K., Peter, H.A.S., James, T.S., and Stanley, T.W. 1994. *Bergey's Manual of Determinative Bacteriology 9th Edition*. United States of America: A Waverly Company.
- Husein, Dirayah R dan Irna, Haemi M. 2005. Bakteri Pengkompleks Logam Pb dan Cd dari Limbah Cair PT. Kawasan Industri Makassar. *Marina Chimica Acta*. **6**: 25-28.
- Hu, T.L. 2001. Kinetics of azoreductase and assessment of toxicity of metabolic products from azo dyes by *Pseudomonas luteola*. *Water Science and Technology*. **43**: 261–269.
- Isminingsih. 1978. *Pengantar Kimia Zat Warna*. Bandung: STTT.
- Jun, Huang., and Wang, X.G. 2006. Laccase Activity in *Klebsiella* sp.601 Isolated from Soil and Its Enzymatic Properties. *Chemistry and Bioengineering*.
- Kaira, Gaurav, S., Khusam, D., and Anita, P. 2015. A Psychrotolerant Strain of *Serratia marcescens* (MTCC 4822) Produces Laccase at Wide Temperature and pH Range. *AMB Express*. 1-8.
- Kara, Patrisia, I., V. Irene, Meitiniarti, dan K.H.Timotius. 2008. Pertumbuhan *Enterococcus faecalis* ID 6017 dan Kemampuan Dekolorisasi Beberapa Konsentrasi Orange II dalam Sistem Sinambung. *Biota*. **13**: 1-7.
- Kep.Gubernur Kepala DIY No.281/1998. *Baku Mutu Limbah cair untuk industry tekstil*. <http://bapedalda.go.id>



- Kurniati, Pythag. 2015. *Anak Sungai Bengawan Solo Tercemar Limbah Batik*. <http://jateng.metrotvnews.com/read/2015/11/14/190797/anak-sungai-bengawan-solo-tercemar-limbah-batik>. Diakses tanggal 13 Januari 2016.
- Kokare, C.R., S Chakraborty, A N Khopade and K R Mahadik. 2009. Biofilm: Importance and applications. *Indian Journal of Biotechnology*. **8**: 159-168.
- Lemmens and N Wulijarni-Soetjipto. 1999. *Sumber Daya Nabati Asia Tenggara, No.3 "Tumbuhan Penghasil Pewarna dan Tanin"*. Jakarta: Balai Pustaka.
- Lusianti, L. P, dan Faisyal, R. 2012. Model Diplomasi Indonesia Terhadap UNESCO dalam Mematenkan Batik sebagai Warisan Budaya Indonesia Tahun 2009. *Jurnal Transnasional*. Vol.3. No.2.
- Madigan, Machael., John, M., David, S and David, C. 2012. *Brock Biology of Microorganisms*. Thirteenth Edition. Sanfransisco. Pearson Education.
- Manu, B., and Sanjeev, C. 2003. Decolorization of Indigo and Azo Dyes in Semicontinuous Reactors with Long Hydraulic Retention Time. *Process Biochemistry*. **38**: 1213-1221.
- Martani, E., dan S, Margino. 2007. *Handout Biodegradasi dan Bioremediasi*. Yogyakarta: Fakultas Biologi UGM.
- Mathur, Nupur., and Pradeep, B. 2007. Mutagenecity Assesment of textile Dyes from Sanganer (Rajasthan). *Journal of Enviromental Biology*. **28**: 123-126.
- Meitiniarti, V. I. 2007. Product of Azo Orange II Biodegradation by *Enterococcus faecalis* ID6017 and *Chryseobacterium indolegenes* ID6016. *Microbiology Indonesia*. **1**: 51-54.
- Moreira, M.T., Mielgo, I., Feijoo, G., and Lema, J.M. 2000. Evaluation of different fungal strains in the decolourization of synthetic dyes. *Biotechnology Letters*. **22**: 1499–1503.
- Nq, I.S., Zhang, X., Zhang, Y., and Lu, Y. 2013. Molecular Cloning and Heterologous Expression of Laccase from *Aeromonas hydrophila* NIU01 in *Escherichia coli* with Parameters Optimization in Production. *Applied Biochemistry and Biotechnology*. **169**: 2223-2235.
- Nurainun, H., dan Rasyimah. 2008. Analisis Industri Batik di Indonesia. *Fokus Ekonomi*. **7**: 124-135.
- Ogugbue, Chimezie, J., and Thomas, S. 2011. Bioremediation and Detoxification of Synthetic Wastewater Containing Triarylmethane Dyes by *Aeromonas*



- hydrophila* Isolated from Industrial Effluent. *Biotechnology Research International*. 2011: 1-11.
- Park, Ho, Y., Ki, D.K., and Dong, H.S. 2002. A Novel Microorganism of Serratia Family, Isolation Method and Preparation Method of Lignin Lyases Using This. *Korea Research Institute of Bioscience and Biotech*.
- Pointing, S, B., and Vrijmoed, L.L.P. 2000. Decolorization of azo and triphenylmethane dyes by *Pycnoporus sanguineus* producing laccase as the sole phenoloxidase. *World Journal of Microbiology and Biotechnology*. **16**: 317–318.
- Poulin, Jennifer. 2007. Identification of Indigo and Its Degradation Products on a Silk Textile Fragment Using Gas Chromatography-Mass Spectrometry. *Journal of the Canadian Association for Conservation (J.CAC)*. **32**: 48-56.
- Price, N. C., and Lewis, S. 1989. *Fundamentals of Enzymology (Second Edition)*. New York: Oxford University Press.
- Priest, F., and Michael, Goodfellow. 1999. *Applied Microbial Systematics*. Kluwer Academic Publishers. Dordrecht: Netherland.
- Ramnya, M., Bhaskar, A., and S. Kalavathy. 2008. Decolorization and Biodegradation of Indigo carmine by a Textile Soil Isolate *Paenibacillus larvae*. *Biodegradation*. **19**: 283-291.
- Rini, Y.A.P., 2014. Biodegradation of Azo Dye Orange G By Immobilization of Isolated Bacteria. *UGM*. Repository.ugm.ac.id. Diakses tanggal 20 Juni 2016
- Saranraj, P.V., Sumathi and D.Reetha, 2010. Decolourization and Degradation of Direct Azo Dyes and Biodegradation of Textile Dye Effluent by Using Bacteria Isolated from Textile Dye Effluent. *Journal of Ecobiotechnology*. **2**: 7-11.
- Saratale, G. R., Ganesh, D. S., Jo Shu Chang., and Sanjay, P. G. 2011. Decolorization and Degradation of Reactive Azo Dyes by Fixed Bed Bioreactors Containing Immobilized Cells of *Proteus vulgaris* NCIM 2027. *Biotechnology and Bioprocess Engineering*. **16**: 830-842.
- Sethi, Sonia., Shubhum, Mohan, M.M., Neelam, S., and Saksham, G. 2012. Biodecolorization of Azo Dye by Microbial Isolates from Textile Effluent and Sludge. *Universal Journal of Environmental research and Technology*. **2**: 582-590.
- Shah, Maulin, P., Patel, K.A., Nair, S.S., Darji, A.M., and Maharaul, S.J. 2013. Microbial decolorization and Degradation of Orange 16 Dye by a Newly



- Isolated *Aeromonas* Spp. Etl-1949. *Bioremediation and Biodegradation*. **4**: 1-6.
- Shah, Maulin, P. 2014. Evaluation of *Aeromonas* Spp. in Microbial Degradation and Decolorization of Reactive Black in Microaerophilic-Aerobic condition. *Bioremediation and Biodegradation*. **5**: 1-8.
- Sheth, N.T., and Dave, S.R. 2009. Optimization for Enhanced Decolourization and Degradation of Reactive Red BS C.I.111 by *Pseudomonas Aeruginosa* NGKCTS. *Biodegradation*. **20**: 827-836.
- Singh, Gursharan., Neena, C., Rashmi, G., and Prince, Sharma. 2007. A pH-stable Laccase from Alkali-tolerant γ -proteobacterium JB: Purification, Characterization and Indigo Carmine Degradation. *Enzyme and Microbial Technology*. **41**: 794-799.
- Solis-Oba, Myrna., Javier, A., and Gustavo, V.G. 2008. Biotechnological Treatment for Colorless Denim and Textil Wastewater Treatment with Laccase and ABTS. *Revista Internacional de Contaminacion Ambiental*. **24**: 5-11.
- Sriram, N., D. Reetha., a P, Saranraj. 2013. Biological Degradation of Reactive Dyes by Using Bacteria Isolated from Dye Effluent Contaminated Soil. *Middle-East Journal of Scientific Research*. **17**: 1695-1700.
- Straathtof, Adrie, J.J., and Patrick, Adlercreutz. 2000. *Applied Biocatalysis, 2nd Edition*. London: Taylor & Francis.
- Suparno. 2010. *Degradasi Zat Warna Indigosol dengan Metode Oksidasi Katalitik Menggunakan Zeolit Alam Teraktivasi dan Ozonisasi*. Thesis. Depok : FMIPA UI
- Susanto, S. 1973. *Seni Kerajinan Batik Indonesia*. Yogyakarta: BPKB.
- Syed, M.A., Sim, H.K., Khalid, K., and Shukor, M.Y. 2009. A Simple method to Screen for Azo-Dye-Degrading Bacteria. *Journal Enviroment Biology*. **30**: 89-92.
- Usha, M.S., B.Sasirekha., R. B. Bela., S. Devi., C. Kamalini., G. A. Manasa., and P. M. Neha. 2012. Batch, Repeated Batch and Continous Degradation of Reactive Black 5 and Reactive Red 120 Dye by Immobilized Bacteria. *Journal of Scientific & Industrial Research*. **71**: 504-510.
- Verma, P., and Madamwar, D. 2003. Decolorization of synthetic dyes by a newly isolated strain of *Serratia maerascens*. *World Journal of Microbiology and Biotechnology*. **19**: 615-618.



- Wang, H., Jian, Q. S., Xiao, W.Z., Yun, T., Xiao, J. X., and Tian, L. Z. 2009. Bacterial Decolorization and Degradation of Reactive Dye Reactive Red 180 by *Citrobacter* sp. CK3. *International Biodeterioration & Biodegradation*. **63**: 395-399.
- Watini. 2009. *Pengaruh Waktu Kontak Enceng Gondok (Eichornia crassipes) terhadap Penurunan Kadar Cd dan Cr pada Air Limbah Industri Batik (Home Industry Batik di Desa Sokaraja Lor) Kota Purwokerto*. Purwokerto: Fakultas Kedokteran dan Ilmu-Ilmu Kesehatan Universitas Jenderal Soedirman.
- Wong, P.K. and P.Y. Yuen. 1996. Decolorization and Biodegradation of Methyl Red by *Klebsiella pneumoniae* RS-13. *Water Research*. **30**: 1736-1744.
- Wu, J., Kim, K.S., Lee, J.H., and Lee, Y.C. 2010. Cloning, Expression in *Escherichia coli* an Enzymatic Properties of Laccase from *Aeromonas hydrophila* WL-11. *Journal Environment Science*. **22**: 635-640.
- Yulianingsih. 2012. *Industri Batik Yogyakarta Terimbas Kenaikan Dolar*. Republik Online. Diakses tanggal 22 Desember 2014.
- Yusof, Hanisah. (2014). Optimization of Laccase Production by *Klebsiella* sp.: Effect of Nutrition Factory on Medium Formulation. *Institutional Repository*. Bio-Industrial Technology University of Malaysia Kelantan.
- Zhao, M. 2006. *Synthesis and Application of Novel Heterobifunctional Reactive Dyes*. Thesis. North Carolina State University.
- Zimmermann, T., H.G.Kulla, and T. Leisinger. 1982. Properties of Purified Orange II Azoreductase, the Enzyme Initiating Azo Dye Degradation by *Pseudomonas* KF46. *Eur. J. Biochem*. **129**: 197-203.
- Zulaeha, S. 2013. *Batik: Warisan Budaya Tak Benda untuk Kemanusiaan*. Artikel Balai Pengkajian Bioteknologi BPPT. Diakses tanggal 5 Januari 2015.